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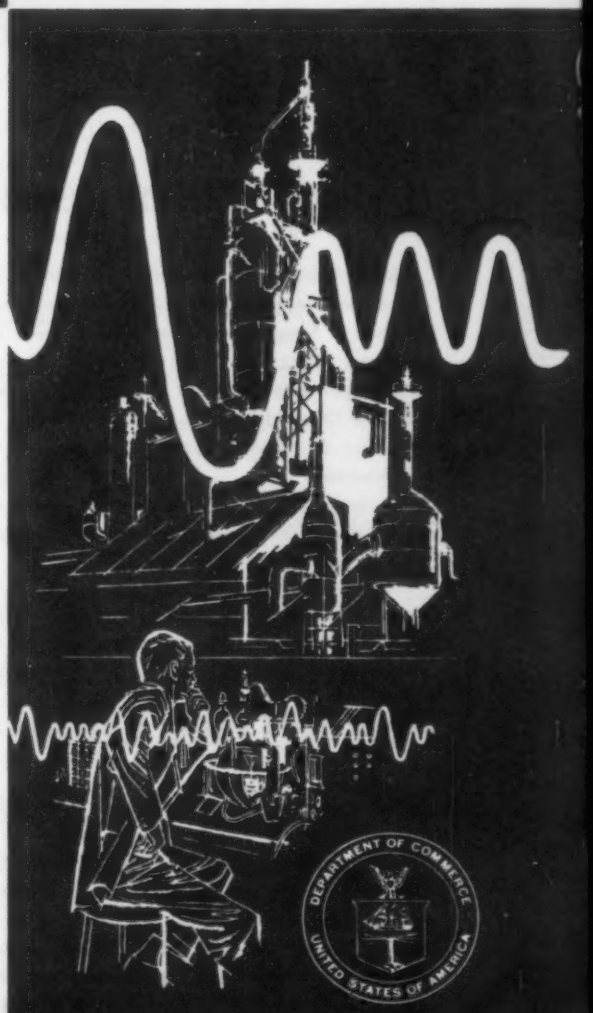

U. S. DEPARTMENT OF COMMERCE
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(*AURORAE; *SPECTROGRAPHIC ANALYSIS; MEASUREMENT; SPECTROPHOTOMETERS; HYDROGEN; RADIO SIGNALS; REFLECTION.) (*SKY BRIGHTNESS; SPECTROGRAPHIC ANALYSIS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 324 62-3-1 DIV. 2

***AUTOMATIC WEAPONS**

(*AUTOMATIC WEAPONS; *SMALL ARMS; *FEED MECHANISMS; EFFECTIVENESS; TESTS.) (SMALL ARMS AMMUNITION; PACKAGING; CONTAINERS.)
ARMY INFANTRY BOARD, FORT BENNING, GA.
AD-274 387 62-3-1 DIV. 22

(*AIRCRAFT GUNS; *AUTOMATIC WEAPONS; CAMS; FEED MECHANISMS; FIRING MECHANISMS; HYDRAULIC SYSTEMS; BOLTS; DESIGN; BORESIGHTING; TESTS.)
GENERAL ELECTRIC CO., BURLINGTON, VT.
AD-274 389 62-3-1 DIV. 22

***AUTOMATION**

(*BIBLIOGRAPHY; *MAINTENANCE; *HUMAN ENGINEERING.) (*AUTOMATION; MAINTENANCE PERSONNEL; TRAINING; ATTENTION.) (ELECTRONIC EQUIPMENT; COMPUTERS; FLIGHT INSTRUMENTS.) (TIME; COSTS; QUALITY CONTROL.)
RAND CORP., SANTA MONICA, CALIF.
AD-274 038 62-3-1 DIV. 28

***AUXILIARY POWER PLANTS**

(*GENERATORS, AUXILIARY POWER PLANTS; *THERMOELECTRICITY; *ISOTOPES; HEAT TRANSFER; HEAT EXCHANGERS, COOLING; MANUFACTURING METHODS.) (POWER PLANTS; POWER SUPPLIES; *ELECTRIC POWER PRODUCTION; *NUCLEAR POWER PLANTS; THERMAL CONDUCTIVITY; THERMOCOUPLES; IMPEDANCE MATCHING; TESTS.)
WESTINGHOUSE ELECTRIC CORP., CHESWICK, PA.
AD-274 280 62-3-1 DIV. 7

***AVIATION ACCIDENTS**

(ATMOSPHERE; *TURBULENCE; *AVIATION ACCIDENTS.) (*JET STREAMS (METEOROLOGY); WIND; TEMPERATURE.) GRAVITY.
COLORADO STATE U. RESEARCH FOUNDATION, FORT COLLINS.
AD-274 376 62-3-1 DIV. 2

***AVIATION FUELS**

(*AVIATION FUELS; *JET ENGINE FUELS; *HANDBOOKS; USSR; THERMOCHEMISTRY; HEAT; *THERMODYNAMICS; VISCOSITY; DENSITY; SURFACE TENSION; VAPORIZATION; THERMAL CONDUCTIVITY; PHYSICAL PROPERTIES; TEST METHODS; TEST EQUIPMENT; TESTS.) KEROSENE; GASOLINE; HEPTANES; HYDROCARBONS.
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 118 62-3-1 DIV. 10

***AVIATION SAFETY**

(*HELICOPTERS; REDUCTION OF *STATIC ELECTRICITY BY *ELECTRIC DISCHARGES; ELECTRICAL CORONA; MATHEMATICAL ANALYSIS.) (HELICOPTERS, HAZARDS; *AVIATION SAFETY; ANALYSIS; COUNTERMEASURES.) (ATMOSPHERE; ATMOSPHERICS; ELECTRICAL PROPERTIES.)
PRINCETON U., N. J.
AD-273 976 62-3-1 DIV. 1

***BALL BEARINGS**

(BEARINGS; *BALL BEARINGS; *ROLLER BEARINGS; LUBRICATION; FATIGUE (MECHANICS).) (*LUBRICATION; *ELASTICITY; DEFORMATION; *HYDRODYNAMICS, THEORY.) (FILMS; ELECTRICAL CONDUCTANCE; X-RAY SPECTROSCOPY.) (SURFACES; FAILURE (MECHANICS); METALS; TRANSPORT PROPERTIES; TRACER STUDIES.) TEST EQUIPMENT; LUBRICANTS.
SKF INDUSTRIES, INC., PHILADELPHIA, PA.
AD-274 137 62-3-1 DIV. 26

***BAND-PASS FILTERS**

(*WAVEGUIDE FILTERS; *BAND-PASS FILTERS; *SUPERHIGH FREQUENCY FILTERS; WAVEGUIDE COUPLERS; RADIOFREQUENCY FILTERS; X BAND; DESIGN.) (WAVEGUIDES; COUPLING CIRCUITS; TUNING DEVICES; PHASE SHIFTERS; MATHEMATICAL ANALYSIS.) (ELECTRICAL PROPERTIES; RESONANCE; STANDING WAVE RATIOS; MEASUREMENT.)
DIAMOND ORDNANCE FUZE LABS., WASHINGTON, D. C.
AD-274 147 62-3-1 DIV. 8

***BARIUM COMPOUNDS**

(*FERROELECTRIC MATERIALS; *FERROELECTRIC CRYSTALS; *STRONTIUM COMPOUNDS; *BARIUM COMPOUNDS; *TITANATES; IMPURITIES OF RARE EARTH ELEMENTS SUCH AS GADOLINIUM; IONS; MICROWAVE SPECTROSCOPY; PARAMAGNETIC RESONANCE; NUCLEAR SPINS; TEMPERATURE; PHASE TRANSITIONS; SPECTROGRAPHIC ANALYSIS; REFRACTIVE PROPERTIES.)
RAYTHEON CO., WALTHAM, MASS.
AD-273 981 62-3-1 DIV. 25

***BEAMS**

(ANALYSIS OF A *GUIDED MISSILE ON A *MISSILE LAUNCHER.) (INTEGRAL EQUATION OF MOTION ON *FLEXIBLE BEAMS AND GUIDED MISSILE; NUMERICAL ANALYSIS IS DEVELOPED FOR SOLUTION.) (BEAMS; LOADING; DYNAMICS.)
ILLINOIS U., URBANA.
AD-274 209 62-3-1 DIV. 25

***BETATRONS**

(*BETATRONS; BEAM POWER TUBES; *ELECTRON BEAMS; FUEL INJECTION; TEST EQUIPMENT.)
NAVAL RESEARCH LAB., WASHINGTON, D. C.
AD-274 032 62-3-1 DIV. 20

***BIBLIOGRAPHY**

(*BIBLIOGRAPHY; *THERMOELECTRICITY; GENERATORS; MATERIALS; RADIATION EFFECTS; RELIABILITY; *FAILURE (MECHANICS); AGING.) (*RADIOACTIVE BATTERIES; NUCLEAR POWER PLANTS; NUCLEAR ENERGY; SELENIUM; TELLURIUM; REACTOR FUELS; TELLURIUM COMPOUNDS.)
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
AD-273 953 62-3-1 DIV. 7

(*BIBLIOGRAPHY; *UNDERWATER SOUND; *UNDERWATER SOUND TRANSMISSION.) (SOUND; ACOUSTICS; SOUND RANGING; DETECTION; SOUND TRANSMISSION.) (OCEAN BOTTOM; OCEANOGRAPHY; SUBMARINE NOISE.)
HUDSON LABS., COLUMBIA U., DOBBS FERRY, N. Y.
AD-273 960 62-3-1 DIV. 25

(*MAGNETIC MATERIALS; BARIUM COMPOUNDS; COBALT COMPOUNDS; IRON COMPOUNDS; NICKEL COMPOUNDS; OXIDES; CRYSTALS FOR MICROWAVE FREQUENCY; *PHASE SHIFTERS; *MICROWAVE NETWORKS; ELECTRONIC CIRCUITS; TEST METHODS; X-RAY DIFFRACTION ANALYSIS; TESTS; MEASUREMENT; SYNTHESIS.) (SUPERHIGH FREQUENCY; EXTREMELY HIGH FREQUENCY; K BAND; RESONANCE; ABSORPTION; MICROWAVE EQUIPMENT.) (*FERRITES; FERROMAGNETIC MATERIALS; *METALLIC CRYSTALS.) *BIBLIOGRAPHY; THEORY.
SPERRY MICROWAVE ELECTRONICS CO., CLEARWATER, FLA.
AD-273 984 62-3-1 DIV. 8

(*BIBL...RAPHY: *SHIELDING: *REACTOR SHIELDING MATERIALS:) (RADIATION HAZARDS: MOON: SPACE FLIGHT: MANNED: COSMIC RAYS: SOLAR FLARES: NUCLEAR POWER PLANTS.) (SCATTERING: NEUTRONS: GAMMA RAYS:) (EXPOSURE SUITS: CONCRETE: LEAD: ALUMINUM: BERYLLIUM: BORON COMPOUNDS: IRON: WATER.)
LOCKHEED AIRCRAFT CORP.: SUNNYVALE: CALIF.
AD-274 015 62-3-1 DIV. 21

(*BIBLIOGRAPHY: *MAINTENANCE: *HUMAN ENGINEERING.) (*AUTOMATION: MAINTENANCE PERSONNEL: TRAINING: ATTENTION:) (ELECTRONIC EQUIPMENT: COMPUTERS: FLIGHT INSTRUMENTS.) (TIME: COSTS: QUALITY CONTROL.)
RAND CORP.: SANTA MONICA: CALIF.
AD-274 035 62-3-1 DIV. 28

(*BIBLIOGRAPHY: *SPACE MEDICINE: *BIOLOGY.) (*PHYSIOLOGY: METABOLISM: NEUROLOGY: SENSORY PERCEPTION: PSYCHOLOGY: PSYCHIATRY: CLOSED-CYCLE ECOLOGICAL SYSTEMS: ASTROPHYSICS: MILITARY PERSONNEL: AVIATION PERSONNEL: PHARMACOLOGY: SAFETY, AIR SEA RESCUES.)
SCIENCE AND TECH. DIV.: LIBRARY OF CONGRESS: WASHINGTON: D. C.
AD-274 064 62-3-1 DIV. 16

(*BIBLIOGRAPHY: ENERGY.)
(*THERMOELECTRICITY: THERMIONIC EMISSION: PHOTOEMISSION: PHOTOELECTRIC CELLS: *MAGNETOHYDRODYNAMICS: ELECTROCHEMISTRY: FUEL CELLS: PRIMARY BATTERIES: STORAGE BATTERIES: NUCLEAR ENERGY: *SOLAR ENERGY: *POWER SUPPLIES: SOLAR CELLS.)
NAVAL RESEARCH LAB.: WASHINGTON: D. C.
AD-274 070 62-3-1 DIV. 7

(*BIBLIOGRAPHY ON *HEAT TRANSFER AT SUPERSONICS: HYPERSONICS.) (AIRFRAMES: METAL PLATES: SURFACES: AERODYNAMIC HEATING: LAMINAR BOUNDARY LAYER: TURBULENT BOUNDARY LAYER: BOUNDARY LAYER: TURBULENCE: PRESSURE: TEMPERATURE.)
MINNESOTA U.: MINNEAPOLIS.
AD-274 109 62-3-1 DIV. 9

(*BIBLIOGRAPHY: *SOUND: *ACOUSTICS: AERODYNAMICS: HYDRODYNAMICS: FLUID MECHANICS.) (*NOISE: JET ACOUSTIC OSCILLATIONS: JET ENGINE NOISE: JET PLANE NOISE: PROPELLER NOISE.) (TURBULENCE: RESONANCE: SHOCK WAVES: SOUND TRANSMISSION.)
CALIFORNIA U.: LOS ANGELES: CALIF.
AD-274 208 62-3-1 DIV. 25

(*REPORTS: SCIENTIFIC REPORTS: CONFERENCES: *TRANSLATIONS: PERIODICALS: *BIBLIOGRAPHY.) (*SCIENTIFIC RESEARCH: MILITARY RESEARCH: ELECTRONICS: RADAR: RADIO: COMMUNICATION SYSTEMS: COMPUTERS.)
LINCOLN LAB.: MASS. INST. OF TECH.: LEXINGTON.
AD-274 253 62-3-1 DIV. 32

(*REINFORCING MATERIALS: *GLASS TEXTILES: *CERAMIC FIBERS, *METALLIC TEXTILES: *FIBERS: WIRE: SINGLE CRYSTALS: METALS: CERAMIC MATERIALS: GRAPHITE: PRODUCTION: DRAWING (MACHINE PROCESSING): EXTRUSION: CASTING: GROWTH: MECHANICAL PROPERTIES: PHYSICAL PROPERTIES: BIBLIOGRAPHY.
CLEVITE CORP.: CLEVELAND: OHIO.
AD-274 379 62-3-1 DIV. 14

*BIOLOGY

(*BIBLIOGRAPHY: *SPACE MEDICINE: *BIOLOGY.) (*PHYSIOLOGY: METABOLISM: NEUROLOGY: SENSORY PERCEPTION: PSYCHOLOGY: PSYCHIATRY: CLOSED-CYCLE ECOLOGICAL SYSTEMS: ASTROPHYSICS: MILITARY PERSONNEL: AVIATION PERSONNEL: PHARMACOLOGY: SAFETY, AIR SEA RESCUES.)
SCIENCE AND TECH. DIV.: LIBRARY OF CONGRESS: WASHINGTON: D. C.
AD-274 064 62-3-1 DIV. 16

*BLAST

(DETERMINATION OF PRESSURE: *BLAST IN TUNNELS RESULTING FROM EXTERIOR *UNDERGROUND STRUCTURES: *NUCLEAR EXPLOSIONS.) (ATTENUATION: PROPAGATION: REFLECTION OF SHOCK WAVES IN TUNNELS.) (BLAST: SHIELDING.) (*SHOCK TUBES FOR TESTING: BLAST IN TUNNELS.)
BALLISTIC RESEARCH LABS.: ABERDEEN PROVING GROUND: MD.
AD-274 228 62-3-1 DIV. 22

*BODY TEMPERATURE

(*SKIN: *BODY TEMPERATURE: BLOOD CIRCULATION, TEMPERATURE CONTROL: HEAT TRANSFER: HEAT PRODUCTION (BIOLOGY): SWEAT COOLING: DEHYDRATION.)
ST. LOUIS U.: MO.
AD-274 078 62-3-1 DIV. 16

*BOMBS

(*BOMBS: TRAINING AMMUNITION: WIND TUNNELS: TEST EQUIPMENT.) (MACH NUMBER: DRAG: STABILITY: FREE FALL MODELS: SPARK SHADOWGRAPH PHOTOGRAPHY.)
NAVAL ORDNANCE LAB.: WHITE OAK: MD.
AD-274 323 62-3-1 DIV. 25

*BORIDES

(*TITANIUM COMPOUNDS: *BORIDES: *REFRACTORY MATERIALS: THERMODYNAMICS: *VAPORIZATION: HEAT OF FORMATION: HEAT OF SUBLIMATION: THERMOCHEMISTRY: DECOMPOSITION: MASS SPECTROSCOPY: HIGH TEMPERATURE RESEARCH.)
UNION CARBIDE CORP.: PARMA: OHIO.
AD-273 978 62-3-1 DIV. 4

(*ROCKET MOTOR NOZZLES: MATERIALS: *REFRACTORY MATERIALS: THERMAL INSULATION: ABLATION: CORROSION BY EXHAUST GASES: VAPORIZATION: THERMODYNAMICS: THERMAL EXPANSION: ELECTRICAL PROPERTIES: RESISTANCE: HALL EFFECT: HIGH TEMPERATURE RESEARCH: MECHANICAL PROPERTIES: PURIFICATION:) (GRAPHITE: *CARBIDES AND *BORIDES OF HAFNIUM COMPOUNDS: NIOBIUM COMPOUNDS: TITANIUM COMPOUNDS: ZIRCONIUM COMPOUNDS.) (TUNGSTEN: TANTALUM: MOLYBDENUM: COMPATIBILITY, TITANIUM COMPOUNDS: BORIDES.) (ZIRCONIUM COMPOUNDS: BORIDES: HEAT OF FORMATION.)
UNION CARBIDE RESEARCH INST.: TARRYTOWN: N. Y.
AD-274 186 62-3-1 DIV. 27

*BORON COMPOUNDS

(*FLUORIDES: *BORON COMPOUNDS: *OXIDES: LABELED SUBSTANCES: BORON: ISOTOPES: SYNTHESIS: CHEMICAL REACTIONS: DISPROPORTIONATION: DECOMPOSITION: THERMOCHEMISTRY: HEAT OF REACTION: HEAT OF FORMATION: ENTROPY: REACTION KINETICS: INFRARED SPECTROSCOPY: LOW TEMPERATURE RESEARCH: HIGH TEMPERATURE RESEARCH.
HUGHES TOOL CO.: CULVER CITY: CALIF.
AD-274 243 62-3-1 DIV. 4

*BOUNDARY LAYER

(*AERODYNAMIC CONFIGURATIONS: *LAMINAR BOUNDARY LAYER: *COMPRESSIBLE FLOW: SUBSONIC FLOW: SUPERSONIC FLOW: *HYPERSONIC FLOW: VISCOSITY.) (*BOUNDARY LAYER: *EQUATIONS: *NUMERICAL ANALYSIS: *DIFFERENTIAL EQUATIONS: *DIFFERENCE EQUATIONS: *PARTIAL DIFFERENTIAL EQUATIONS.) (SHEETS (FLAT PLATES): SHEAR STRESSES: HEAT TRANSFER: STABILITY: SHOCK WAVES.)
STANFORD U.: CALIF.
AD-273 983 62-3-1 DIV. 9

*BOUNDARY LAYER CONTROL

(*DIFFUSERS: *BOUNDARY LAYER CONTROL BY AREA SUCTION IN TURBOJET INLETS: RAMJET INLETS OF TURBOJET ENGINES: RAMJET ENGINES.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION: WASHINGTON: D. C.
AD-274 329 62-3-1 DIV. 27

*BUCKLING

(*STIFFENED CYLINDERS: *BUCKLING: TEMPERATURE: THERMAL STRESSES: STRESSES: LOAD DISTRIBUTION: THERMAL EXPANSION: THEORY: MATHEMATICAL ANALYSIS: MATHEMATICAL PREDICTION.)
CYLINDRICAL BODIES: AERODYNAMIC HEATING.
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION: WASHINGTON: D. C.
AD-274 326 62-3-1 DIV. 25

*CAMERA SHUTTERS

(*HIGH SPEED CAMERAS HAVING *IMAGE CONVERTER TUBES: IMAGE INTENSIFIERS (ELECTRONICS): *CAMERA SHUTTERS: DESIGN.) (INTERFEROMETERS: SCHLIEREN PHOTOGRAPHY: HIGH SPEED PHOTOGRAPHY: GAS FLOW: AERODYNAMICS.)
RAULAND CORP.: CHICAGO: ILL.
AD-274 353 62-3-1 DIV. 24

*CARBIDES

(*SINGLE CRYSTALS: *SILICON COMPOUNDS: *CARBIDES: PRODUCTION: GROWTH BY PYROLYSIS OF METHYL RADICALS: CHLORIDES: SILANES.) (ELASTICITY: MECHANICAL PROPERTIES: TENSILE PROPERTIES: PHYSICAL PROPERTIES: DENSITY: DETERMINATION.) TEST EQUIPMENT: TEST METHODS: X-RAY DIFFRACTION ANALYSIS.
CORNELL AERONAUTICAL LAB., INC.: BUFFALO: N. Y.
AD-273 997 62-3-1 DIV. 14

(*CERAMIC MATERIALS: *GRAPHITE: THERMAL RADIATION: BLACKBODY RADIATION: ABSORPTION: HEAT TRANSFER FROM SURFACES.) (*CARBIDES OF SILICON COMPOUNDS: TANTALUM COMPOUNDS: TUNGSTEN COMPOUNDS: ZIRCONIUM COMPOUNDS: NICKEL ALLOYED WITH TITANIUM COMPOUNDS.) (*NITRIDES OF BORON COMPOUNDS.) (*OXIDES OF ALUMINUM COMPOUNDS, BERYLLIUM COMPOUNDS: MAGNESIUM COMPOUNDS: ZIRCONIUM COMPOUNDS.) (*SILICIDES OF MOLYBDENUM COMPOUNDS.) DATA, TABLES.
DEFENSE METALS INFORMATION CENTER: COLUMBUS: OHIO.
AD-274 148 62-3-1 DIV. 14

(*ROCKET MOTOR NOZZLES: MATERIALS: *REFRACTORY MATERIALS: THERMAL INSULATION: ABLATION: CORROSION BY EXHAUST GASES: VAPORIZATION: THERMODYNAMICS: THERMAL EXPANSION: ELECTRICAL PROPERTIES: RESISTANCE: HALL EFFECT: HIGH TEMPERATURE RESEARCH: MECHANICAL PROPERTIES: PURIFICATION:) (GRAPHITE: *CARBIDES AND *BORIDES OF HAFNIUM COMPOUNDS: NIOBIUM COMPOUNDS: TITANIUM COMPOUNDS: ZIRCONIUM COMPOUNDS.) (TUNGSTEN: TANTALUM: MOLYBDENUM: COMPATIBILITY, TITANIUM COMPOUNDS: BORIDES.) (ZIRCONIUM COMPOUNDS: BORIDES: HEAT OF FORMATION.)
UNION CARBIDE RESEARCH INST.: TARRYTOWN: N. Y.
AD-274 186 62-3-1 DIV. 27

(SILICON: SILICON COMPOUNDS: *CARBIDES: RADIATION TOLERANCE: *SEMICONDUCTORS.) (HIGH FREQUENCY: *TRANSISTORS: THERMAL UTILIZATION: TEST EQUIPMENT.)
STURTEVANT DIV.: WESTINGHOUSE ELECTRIC CORP.: BOSTON: MASS.
AD-274 187 62-3-1 DIV. 25

*CASTING

(*CASTINGS: MOLDING: MANUFACTURING METHODS: ROLLING MILLS: *SHEETS: METALS: ALLOYS: LIQUID METALS: STEEL: IRON.) (*ELECTRIC WELDING: *ARC WELDING: *WELDING: ELECTRON BEAMS: AUTOMATIC: PRESSURE: VIBRATION: ULTRASONICS: SLAGS.) USSR.
FOREIGN TECH. DIV.: AIR FORCE SYSTEMS COMMAND: WRIGHT-PATTERSON AIR FORCE BASE: OHIO.
AD-274 120 62-3-1 DIV. 26

*CASTINGS

(*CASTINGS: MOLDING: MANUFACTURING METHODS: ROLLING MILLS: *SHEETS: METALS: ALLOYS: LIQUID METALS: STEEL: IRON.) (*ELECTRIC WELDING: *ARC WELDING: *WELDING: ELECTRON BEAMS: AUTOMATIC: PRESSURE: VIBRATION: ULTRASONICS: SLAGS.) USSR.
FOREIGN TECH. DIV.: AIR FORCE SYSTEMS COMMAND: WRIGHT-PATTERSON AIR FORCE BASE: OHIO.
AD-274 120 62-3-1 DIV. 26

*CATHODE RAY TUBES

(*ELECTRONICS: *TEXTBOOKS: USSR.) (ELECTRON TUBES: AMPLIFIERS, RADIO RECEIVERS, RADIO TRANSMITTERS.) (ELECTRON TUBES: SUPERHIGH FREQUENCY.) ELECTRONS: THEORY: *ELECTRON OPTICS: THERMIONIC EMISSION: PHOTOEMISSION: *CATHODES: OXIDE CATHODES: *DIODES: *TRIODES: TETRODES: PENTODES: *ELECTRON TUBES: FREQUENCY CONVERTERS: *SEMICONDUCTORS: *CATHODE RAY TUBES: KLYSTRONS: MAGNETRONS: TRAVELING WAVE TUBES: *PHOTOTUBES, PHOTOMULTIPLIERS, X RAYS: ELECTRON TUBES.
FOREIGN TECH. DIV.: AIR FORCE SYSTEMS COMMAND: WRIGHT-PATTERSON AIR FORCE BASE: OHIO.
AD-274 063 62-3-1 DIV. 8

*CATHODES

(*ELECTRONICS: *TEXTBOOKS: USSR.) (ELECTRON TUBES: AMPLIFIERS, RADIO RECEIVERS, RADIO TRANSMITTERS.) (ELECTRON TUBES: SUPERHIGH FREQUENCY.) ELECTRONS: THEORY: *ELECTRON OPTICS: THERMIONIC EMISSION: PHOTOEMISSION: *CATHODES: OXIDE CATHODES: *DIODES: *TRIODES: TETRODES: PENTODES: *ELECTRON TUBES: FREQUENCY CONVERTERS: *SEMICONDUCTORS: *CATHODE RAY TUBES: KLYSTRONS: MAGNETRONS: TRAVELING WAVE TUBES: *PHOTOTUBES, PHOTOMULTIPLIERS, X RAYS: ELECTRON TUBES.
FOREIGN TECH. DIV.: AIR FORCE SYSTEMS COMMAND: WRIGHT-PATTERSON AIR FORCE BASE: OHIO.
AD-274 063 62-3-1 DIV. 8

*CELESTIAL MECHANICS

(*SATELLITE VEHICLES: ORBITAL FLIGHT PATHS: SATELLITE VEHICLE TRAJECTORIES: LIFE EXPECTANCY: MOTION: GRAVITY: *CELESTIAL MECHANICS: PERTURBATION THEORY: THEORY: MATHEMATICAL ANALYSIS: MATHEMATICAL PREDICTION: DIFFERENTIAL EQUATIONS.)
NAVAL SUPERSONIC LAB.: MASS. INST. OF TECH.: CAMBRIDGE.
AD-274 113 62-3-1 DIV. 12

(*SATELLITE VEHICLES: ORBITAL FLIGHT PATHS: SATELLITE VEHICLE TRAJECTORIES: SATELLITE ATTITUDE: *CELESTIAL MECHANICS: PERTURBATION THEORY.)
ASTROPHYSICAL OBSERVATORY: SMITHSONIAN INSTITUTION: CAMBRIDGE: MASS.
AD-274 347 62-3-1 DIV. 12

*CERAMIC FIBERS

(*REINFORCING MATERIALS: *GLASS TEXTILES: *CERAMIC FIBERS, *METALLIC TEXTILES: *FIBERS: WIRE: SINGLE CRYSTALS: METALS: CERAMIC MATERIALS: GRAPHITE: PRODUCTION: DRAWING (MACHINE PROCESSING): EXTRUSION: CASTING: GROWTH: MECHANICAL PROPERTIES: PHYSICAL PROPERTIES: BIBLIOGRAPHY.
CLEVITE CORP.: CLEVELAND: OHIO.
AD-274 379 62-3-1 DIV. 14

*CERAMIC MATERIALS

(*CERAMIC MATERIALS; *GRAPHITE; THERMAL RADIATION; BLACKBODY RADIATION; ABSORPTION; HEAT TRANSFER FROM SURFACES.) (*CARBIDES OF SILICON COMPOUNDS; TANTALUM COMPOUNDS; TUNGSTEN COMPOUNDS; ZIRCONIUM COMPOUNDS; NICKEL ALLOYED WITH TITANIUM COMPOUNDS.) (*NITRIDES OF BORON COMPOUNDS.) (*OXIDES OF ALUMINUM COMPOUNDS; BERYLLIUM COMPOUNDS; MAGNESIUM COMPOUNDS; ZIRCONIUM COMPOUNDS.) (*SILICIDES OF MOLYBDENUM COMPOUNDS.) DATA; TABLES.
DEFENSE METALS INFORMATION CENTER; COLUMBUS; OHIO.
AD-274 148 62-3-1 DIV. 14

*CHELATE COMPOUNDS

(ROCKET CASES; COMBUSTION CHAMBER LINERS FOR SOLID ROCKET PROPELLANTS; *THERMAL INSULATION; POLYMERS; *HEAT RESISTANT POLYMERS.) (SYNTHESIS BY COPOLYMERIZATION; VINYL RADICALS; *METALORGANIC COMPOUNDS; *SILICON COMPOUNDS; *TIN COMPOUNDS; *TITANIUM COMPOUNDS; *CHELATE COMPOUNDS; PROCESSING; AGING WITH CATALYSTS.)
HUGHES AIRCRAFT CO.; CULVER CITY; CALIF.
AD-274 393 62-3-1 DIV. 27

*CHEMICAL BONDS

(*SOLIDS; *CRYSTALS; *CRYSTAL STRUCTURE; *QUANTUM MECHANICS; *CHEMICAL BONDS; ELECTRONS; SPIN; ATOMIC ORBITALS; THEORY.)
SOLID STATE PHYSICS; VALENCE.
UPPSALA U. (SWEDEN).
AD-274 277 62-3-1 DIV. 25

*CHEMICAL IMPURITIES

(*SPECTROGRAPHIC ANALYSIS OF *CHEMICAL IMPURITIES IN *SEMICONDUCTORS.) (SEMICONDUCTORS; ARSENIDES; GALLIUM COMPOUNDS; ELECTRICAL PROPERTIES; CRYSTALLIZATION.) (PRODUCTION OF SEMICONDUCTORS.) VAPORIZATION.
GENERAL TELEPHONE AND ELECTRONICS LABS.; INC.; BAYSIDE; N. Y.
AD-273 969 62-3-1 DIV. 25

*CHLOROPHYLLS

(*PHOTOSYNTHESIS; SIMULATION.) (*CHLOROPHYLLS; BIOCHEMISTRY.)
ARMOUR RESEARCH FOUNDATION; CHICAGO; ILL.
AD-274 038 62-3-1 DIV. 16

*CIRCUIT TESTERS

(TEST SETS; TEST EQUIPMENT; TEST METHODS; *TEST FACILITIES; MILITARY EQUIPMENT; *ELECTRONIC EQUIPMENT; INSTRUMENTATION; DESIGN.) (*CIRCUIT TESTERS; PRINTED CIRCUITS; *ELECTRONIC CIRCUITS; TUNED AMPLIFIERS; PREAMPLIFIERS; SIGNAL-TO-NOISE RATIO; TEST EQUIPMENT; TESTS.) (FIELD WIRE COMMUNICATION SYSTEMS; SIDEBANDS; SIGNAL GENERATORS; *PHASE SHIFTERS; BROADBAND MODULATORS; HALL EFFECT.) ELECTRICAL PROPERTIES; DETERMINATION.
ARMOUR RESEARCH FOUNDATION; CHICAGO; ILL.
AD-274 285 62-3-1 DIV. 30

*CIRCUITS

(*PRINTED CIRCUITS; *ELECTRICAL CORONA; ELECTRIC ARCS; ELECTRIC DISCHARGES; FAILURE (MECHANICS); TESTS; DIELECTRICPROPERTIES.) (ELECTRONIC CIRCUITS; *CIRCUITS; *CONDUCTORS; TEST EQUIPMENT; HIGH ALTITUDE; HIGH TEMPERATURE RESEARCH; HUMIDITY; TESTS.) (AIRBORNE; ELECTRONIC EQUIPMENT; NAVAL EQUIPMENT; AVIATION SAFETY; SAFETY.)
NAVAL AVIONICS FACILITY; INDIANAPOLIS; IND.
AD-273 958 62-3-1 DIV. 8

*CLASSIFICATION

(*DATA PROCESSING SYSTEMS; LEARNING; *CLASSIFICATION; COMPUTERS.) (SONAR EQUIPMENT; TARGET POSITION INDICATORS; *COMPUTER LOGIC; ERRORS; TEST METHODS.)
NAVAL ORDNANCE LAB.; WHITE OAK; MD.
AD-274 260 62-3-1 DIV. 9

*CLOSED-CYCLE ECOLOGICAL SYSTEMS

(*RESPIRATION; CLOSED-CYCLE ECOLOGICAL SYSTEMS; OXYGEN; METABOLISM.) (*WATER VAPOR; DISPOSAL AND RECOVERY; CARBON DIOXIDE; ADSORPTION.) (FREEZE DRYING; DEHYDRATION; *DECONTAMINATION; FEASIBILITY STUDIES.)
AIRESEARCH MFG. CO.; LOS ANGELES; CALIF.
AD-274 141 62-3-1 DIV. 16

*CLOUDS

(CONFIGURATION OF *CLOUDS BY AERIAL PHOTOGRAPHY AND MAPPING TECHNIQUES USING *AERIAL CAMERAS.) (*AIRCRAFT; *TURBULENCE; GUST LOADS; FLIGHT PATHS.)
COLORADO STATE U. RESEARCH FOUNDATION; FORT COLLINS.
AD-274 389 62-3-1 DIV. 2

(REDUCTION OF *CLOUDS BY *ARTIFICIAL PRECIPITATION.) (CARBON; *PARTICLES FOR SEEDING.) (LIGHT; SCATTERING; ABSORPTION.)
ARMY SIGNAL RESEARCH AND DEVELOPMENT LAB.; FORT MONMOUTH; N. J.
AD-274 360 62-3-1 DIV. 2

*CODING

(*DATA PROCESSING SYSTEMS; *DIGITAL COMPUTERS; *CODING; PROGRAMMING.) (COMPUTER LOGIC; MATHEMATICAL LOGIC; TABLES.)
DAVID TAYLOR MODEL BASIN; WASHINGTON; D. C.
AD-274 130 62-3-1 DIV. 30

*COCCIDIOIDES

(*ORGANIC COMPOUNDS; MONOCYCLIC COMPOUNDS; POLYCYCLIC COMPOUNDS; INFORMATION THEORY; *CODING; COMPUTERS; *DATA STORAGE SYSTEMS; DOCUMENTATION.) *MOLECULAR STRUCTURE.
AMERICAN CHEMICAL SOCIETY; WASHINGTON; D. C.
AD-274 388 62-3-1 DIV. 32

*COLOR PHOTOGRAPHY

*AERIAL PHOTOGRAPHY; SIMULATION; TEST METHODS FOR TESTS OF EFFECTIVENESS OF COLORS IN *COLOR PHOTOGRAPHY; DETECTION; SURFACE TARGETS; *PHOTOGRAPHIC INTELLIGENCE.
DUNLAP AND ASSOCIATES; INC.; SANTA MONICA; CALIF.
AD-274 145 62-3-1 DIV. 24

*COMBINATORIAL ANALYSIS

(*MATRIX ALGEBRA; *COMBINATORIAL ANALYSIS; SEQUENCES.)
RAND CORP.; SANTA MONICA; CALIF.
AD-274 181 62-3-1 DIV. 15

(*MATRIX ALGEBRA; *COMBINATORIAL ANALYSIS; SEQUENCES.)
RAND CORP.; SANTA MONICA; CALIF.
AD-274 339 62-3-1 DIV. 15

*COMBUSTION

(*LIQUID ROCKET PROPELLANTS; IGNITION; *COMBUSTION; FLAMES; FLAME PROPAGATION; THEORY; MATHEMATICAL ANALYSIS; STATISTICAL ANALYSIS.)
LOCKHEED AIRCRAFT CORP.; SUNNYVALE; CALIF.
AD-273 952 62-3-1 DIV. 10

(*CONFERENCES ON *SOLID ROCKET PROPELLANTS; PROPELLANT GRAINS; *COMBUSTION; INSTABILITY; RESONANCE; JET ACOUSTIC OSCILLATIONS; PRESSURE.) (DETONATION; IGNITION; DECOMPOSITION.) BORON; MECHANICAL PROPERTIES; STRESSES; SHEAR STRESSES.
STANFORD RESEARCH INST.; MENLO PARK; CALIF.
AD-274 132 62-3-1 DIV. 10

*COMMUNICATION EQUIPMENT

(RADAR RECEIVERS; RADIO RECEIVERS; *TELEMETERING ANTENNAS; PARABOLIC ANTENNAS; *COUPLED ANTENNAS; DESIGN; COSTS.) (*TELEMETERING RECEIVERS; *COMMUNICATION EQUIPMENT; GROUND SUPPORT EQUIPMENT FOR SPACE PROBES.) (RADIO SIGNALS; SIGNAL-TO-NOISE RATIO; FREQUENCY MODULATION.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON; D. C.
AD-274 168 62-3-1 DIV. 6

*COMMUNICATION SYSTEMS

(*COMMUNICATION SYSTEMS; *DATA TRANSMISSION SYSTEMS; DIGITAL SYSTEMS; PHASE MODULATION; DETECTORS; ELECTRONIC CIRCUITS; ELECTRICAL NETWORKS; DESIGN; TESTS.) (TELEPHONE LINES; VOICE COMMUNICATION SYSTEMS; CIRCUITS.) (*MODULATORS; AMPLITUDE MODULATION; PHASE SHIFTERS; CIRCUITS; PULSE GENERATORS; RECTIFIERS; OSCILLATORS; PULSE AMPLIFIERS; DESIGN; TESTS.)
INTERNATIONAL BUSINESS MACHINES CORP.; ROCKVILLE MD.
AD-274 034 62-3-1 DIV. 9

(*ELECTROMAGNETIC WAVES; *SCATTERING; PROPAGATION IN *WAVEGUIDES.) (*COMMUNICATION SYSTEMS; *WIRE; CONDUCTIVITY; *ANTENNA RADIATION PATTERNS; HELICAL ANTENNAS.)
CRUFT LAB.; HARVARD U.; CAMBRIDGE; MASS.
AD-274 142 62-3-1 DIV. 25

(*MILITARY COMMUNICATIONS; *OPERATIONS RESEARCH; MILITARY ORGANIZATIONS; EFFECTIVENESS.) (*COMMUNICATION SYSTEMS; MILITARY INTELLIGENCE; SIMULATION; TELEPHONE COMMUNICATION SYSTEMS.)
LABORATORIES FOR RESEARCH AND DEVELOPMENT; FRANKLIN INST.; PHILADELPHIA; PA.
AD-274 241 62-3-1 DIV. 5

*COMPLEX COMPOUNDS

(*COMPLEX COMPOUNDS; *TRANSURANIC ELEMENTS; CHEMICAL PROPERTIES; SEPARATION; PRECIPITATION; *NEPTUNIUM COMPOUNDS; *PLUTONIUM COMPOUNDS; AMERICIUM COMPOUNDS; CURIUM; BERKELIUM; CALIFORNIA.) BIBLIOGRAPHY.
FOREIGN TECH. DIV.; AIR FORCE SYSTEMS COMMAND; WRIGHT-PATTERSON AIR FORCE BASE; OHIO.
AD-274 119 62-3-1 DIV. 4

*COMPRESSIBLE FLOW

(*AERODYNAMIC CONFIGURATIONS; *LAMINAR BOUNDARY LAYER; *COMPRESSIBLE FLOW; SUBSONIC FLOW; SUPERSONIC FLOW; *HYPERSONIC FLOW; VISCOSITY.) (*BOUNDARY LAYER; *EQUATIONS; *NUMERICAL ANALYSIS; *DIFFERENTIAL EQUATIONS; *DIFFERENCE EQUATIONS; *PARTIAL DIFFERENTIAL EQUATIONS.) (SHEETS (FLAT PLATES); SHEAR STRESSES; HEAT TRANSFER; STABILITY; SHOCK WAVES.)
STANFORD U.; CALIF.
AD-273 983 62-3-1 DIV. 9

*COMPUTER LOGIC

(*COMPUTERS; *FEEDBACK; RELIABILITY; *ERRORS; DIGITAL SYSTEMS; PROBABILITY; COMMUNICATION SYSTEMS.) (*COMPUTER LOGIC; METAMATHEMATICS; MEMORY DEVICES; DIGITAL SYSTEMS.)
NEW YORK U.; COLL. OF ENGINEERING; N. Y.
AD-274 029 62-3-1 DIV. 5

(*COMPUTER LOGIC; *TRIGGERED GATES; TRANSISTORS; *DIODES; DELAY CIRCUITS.) DIGITAL COMPUTERS; *MEMORY DEVICES; PROGRAMMING.
RCA INDUSTRIAL ELECTRONIC PRODUCTS; CAMDEN; N. J.
AD-274 177 62-3-1 DIV. 30

(*DIODES; GALLIUM COMPOUNDS; ARSENIDES.) (*COMPUTER LOGIC; TRIGGER CIRCUITS.) MEMORY DEVICES; TRIGGERED GATES.
RCA INDUSTRIAL ELECTRONIC PRODUCTS; CAMDEN; N. J.
AD-274 179 62-3-1 DIV. 30

(*DATA PROCESSING SYSTEMS; LEARNING; *CLASSIFICATION; COMPUTERS.) (SONAR EQUIPMENT; TARGET POSITION INDICATORS; *COMPUTER LOGIC; ERRORS; TEST METHODS.)
NAVAL ORDNANCE LAB.; WHITE OAK; MD.
AD-274 260 62-3-1 DIV. 9

*COMPUTERS

(*COMPUTERS; *FEEDBACK; RELIABILITY; *ERRORS; DIGITAL SYSTEMS; PROBABILITY; COMMUNICATION SYSTEMS.) (*COMPUTER LOGIC; METAMATHEMATICS; MEMORY DEVICES; DIGITAL SYSTEMS.)
NEW YORK U.; COLL. OF ENGINEERING; N. Y.
AD-274 029 62-3-1 DIV. 5

(*SPACE FLIGHT; *MANNED; *SCIENTIFIC RESEARCH; SPACE MEDICINE; BEHAVIOR; *HUMAN ENGINEERING; STRESS (PHYSIOLOGY); STRESS (PSYCHOLOGY).) (*COMPUTERS; LOGISTICS; COSTS.) (*PERSONNEL; SCIENTIFIC PERSONNEL; ENGINEERING PERSONNEL; TRAINING.) SPACE ENVIRONMENTAL CONDITIONS; SIMULATION.
CORNELL AERONAUTICAL LAB.; INC.; BUFFALO; N. Y.
AD-274 033 62-3-1 DIV. 12

*CONCRETE

(*UNDERGROUND STRUCTURES; MATERIALS; *CONCRETE; CEMENT; *ACOUSTIC INSULATION; VIBRATION ISOLATORS; VERMICULITE; IMPACT SHOCK; SHOCK RESISTANCE; DEFORMATION; STRESSES; ATTENUATION; TEST METHODS; TEST EQUIPMENT.) (NUCLEAR EXPLOSIONS; ATOMIC BOMB EXPLOSIONS.) STRUCTURAL MECHANICS RESEARCH LAB.; U. OF TEXAS; AUSTIN.
AD-274 120 62-3-1 DIV. 14

*CONDENSATION TRAILS

(*GUIDED MISSILES; EXHAUST GASES OR *CONDENSATION TRAILS OF *LIGHT AND *LUMINESCENCE WITH RESPECT TO VELOCITY AND DISTANCE OF *PARTICLES EJECTED IN *UPPER ATMOSPHERE.) (AERODYNAMICS; *DRAG; GRAVITY; DIFFERENTIAL EQUATIONS; INTEGRATION; TABLES.)
GEOPHYSICS CORP. OF AMERICA; BEDFORD; MASS.
AD-273 972 62-3-1 DIV. 25

(GUIDED MISSILES; ROCKET MOTORS; *CONDENSATION TRAILS.) (EXHAUST GASES; DIFFUSION; DYNAMICS.) ANALYSIS.
GEOPHYSICS CORP. OF AMERICA; BEDFORD; MASS.
AD-274 153 62-3-1 DIV. 9

*CONDUCTORS

(*PRINTED CIRCUITS; *ELECTRICAL CORONA; ELECTRIC ARCS; ELECTRIC DISCHARGES; FAILURE (MECHANICS); TESTS; DIELECTRICPROPERTIES.) (ELECTRONIC CIRCUITS; *CIRCUITS; *CONDUCTORS; TEST EQUIPMENT; HIGH ALTITUDE; HIGH TEMPERATURE RESEARCH; HUMIDITY; TESTS.) (AIRBORNE; ELECTRONIC EQUIPMENT; NAVAL EQUIPMENT; AVIATION SAFETY; SAFETY.)
NAVAL AVIONICS FACILITY; INDIANAPOLIS; IND.
AD-273 958 62-3-1 DIV. 8

***CONTINUUM MECHANICS**

(*SHEETS AND *CYLINDRICAL BODIES* *DRAG IN A *SUPERSONIC FLOW* *CONTINUUM MECHANICS* *MOLECULES* GAS FLOW* VISCOSITY.) (HEAT TRANSFER* *SUPERAERODYNAMICS* MACH NUMBER.)
INSTITUTE OF ENGINEERING RESEARCH* U. OF CALIF.* BERKELEY.
AD-274 388 62-3-1 DIV. 9

***CONTROL SYSTEMS**

(*CONTROL SYSTEMS* *FEEDBACK* SIGNALS* DAMPING* DIFFERENTIAL EQUATIONS* PURDUE U.* LAFAYETTE* IND.
AD-274 123 62-3-1 DIV. 12

(SYNTHESIS OF *LINEAR SYSTEMS (NONSTATIONARY) *FEEDBACK (SYSTEMS).) (*CONTROL SYSTEMS* POLYNOMIALS* FUNCTIONS* TIME* DIFFERENTIAL EQUATIONS* PARTIAL DIFFERENTIAL EQUATIONS.)
CALIFORNIA U.* LOS ANGELES.
AD-274 230 62-3-1 DIV. 8

(SYNTHESIS OF *LINEAR SYSTEMS (NONSTATIONARY)* *FEEDBACK SYSTEMS.) (*CONTROL SYSTEMS* ALGEBRA* *DIFFERENTIAL EQUATIONS* TIME* FUNCTIONS* POLYNOMIALS* TRANSFORMATIONS (MATHEMATICS)* OPERATORS (MATHEMATICS).)
CALIFORNIA U.* LOS ANGELES.
AD-274 231 62-3-1 DIV. 8

***COPPER ALLOYS**

(*ALUMINUM ALLOYS* *COPPER ALLOYS* *ALUMINUM* CRYSTALS* CRYSTALLIZATION* PROCESSING* DEFORMATION* GRAINS (METALLURGY)* GROWTH* REACTION KINETICS.) METALS* ALLOYS.
ILLINOIS INST. OF TECH.* CHICAGO.
AD-274 285 62-3-1 DIV. 17

***CORROSION**

(CORROSIVE GASES* *DETECTION* *CORROSION* THIN FILMS* METAL FILMS* SPECIFICATIONS* MILITARY REQUIREMENTS.) VAPORS* ACIDS* HUMIDITY* CONTROL SYSTEMS* PACKAGING* STORAGE* WAREHOUSES* CONTAINERS.
MAGNA CORP.* ANAHEIM* CALIF.
AD-274 068 62-3-1 DIV. 17

***COSMIC RAYS**

(*RADIATION COUNTERS OF *COSMIC RAYS AND COSMIC RAY BURSTS.) (RADIOBIOLOGY* LABORATORY ANIMALS.) (PROTONS* *PROTON COUNTERS.) SPACE ENVIRONMENTAL CONDITIONS* BALLOONS* IONIZATION.
AIR FORCE CAMBRIDGE RESEARCH LABS.* BEDFORD* MASS.
AD-274 001 62-3-1 DIV. 20

(*SATELLITE VEHICLES* SPACE PROBES* INSTRUMENTATION FOR MEASUREMENT OF *COSMIC RAYS* *SOLAR FLARES* SOLAR ENERGY* VAN ALLEN RADIATION BELT* *TERRESTRIAL MAGNETISM IN UPPER ATMOSPHERE* IONOSPHERE* SPACE ENVIRONMENTAL CONDITIONS.) ASTROPHYSICS* GEOPHYSICS.
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION* WASHINGTON* D. C.
AD-274 169 62-3-1 DIV. 2

***COUPLED ANTENNAS**

(RADAR RECEIVERS* RADIO RECEIVERS* *TELEMETERING ANTENNAS* PARABOLIC ANTENNAS* *COUPLED ANTENNAS* DESIGN* COSTS.) (*TELEMETERING RECEIVERS* *COMMUNICATION EQUIPMENT* GROUND SUPPORT EQUIPMENT FOR SPACE PROBES.) (RADIO SIGNALS* SIGNAL-TO-NOISE RATIO* FREQUENCY MODULATION.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION* WASHINGTON* D. C.
AD-274 168 62-3-1 DIV. 6

***CRATERING**

(*IMPACT SHOCK FROM *HYPERVELOCITY PROJECTILES* METEORITES* *CRATERING* CAVITATION* VISCOSITY* STRESSES* MATHEMATICAL ANALYSIS* EQUATIONS* THEORY.)
SPACE SCIENCES LAB.* GENERAL ELECTRIC CO.* PHILADELPHIA* PA.
AD-274 048 62-3-1 DIV. 9

***CRYOGENICS**

(*CRYOGENICS* PUMPS* *FLUID MECHANICS* FLUIDS* LIQUEFIED GASES* *FLUID FLOW* THEORY* TESTS.) (MOLECULES* SURFACE PROPERTIES* PRESSURE.) (WIND TUNNELS* VACUUM SYSTEMS* SUPERAERODYNAMICS.) SURFACES* GEOMETRY.
ARNOLD ENGINEERING DEVELOPMENT CENTER* ARNOLD AIR FORCE STATION* TENN.
AD-274 355 62-3-1 DIV. 9

***CRYSTAL OSCILLATORS**

(*QUARTZ RESONATORS* *CRYSTAL OSCILLATORS* *QUARTZ CRYSTALS* CRYSTAL HOLDERS* HIGH FREQUENCY* MEDIUM FREQUENCY* DESIGN* MANUFACTURING METHODS* MILITARY REQUIREMENTS.)
COMMUNICATION EQUIPMENT.
UNION THERMOELECTRIC DIV.* COMPTOMETER CORP.* NILES* ILL.
AD-274 031 62-3-1 DIV. 8

(*CRYSTAL OSCILLATORS* PHASE MODULATION* FREQUENCY MODULATION* *NOISE (RADIO).) (OSCILLATORS* RADIOFREQUENCY FILTERS* STABILITY* FREQUENCY ANALYZERS* NOISE ANALYZERS.) (PHASE STUDIES* CORRELATION TECHNIQUES.)
NEW YORK U.* COLL. OF ENGINEERING* N. Y.
AD-274 115 62-3-1 DIV. 8

***CRYSTAL STRUCTURE**

(*SOLIDS* *CRYSTALS* *CRYSTAL STRUCTURE* *QUANTUM MECHANICS* *CHEMICAL BONDS* ELECTRONS* SPIN* ATOMIC ORBITALS* THEORY.)
SOLID STATE PHYSICS* VALENCE.
UPPSALA U. (SWEDEN).
AD-274 277 62-3-1 DIV. 25

***CRYSTALS**

(*SOLIDS* *CRYSTALS* *CRYSTAL STRUCTURE* *QUANTUM MECHANICS* *CHEMICAL BONDS* ELECTRONS* SPIN* ATOMIC ORBITALS* THEORY.)
SOLID STATE PHYSICS* VALENCE.
UPPSALA U. (SWEDEN).
AD-274 277 62-3-1 DIV. 25

***CYANO RADICALS**

(*FLAMES* COMBUSTION* GASES* AIR* HYDROCARBONS* *CYANO RADICALS* SPECTROGRAPHIC ANALYSIS* MOLECULAR SPECTROSCOPY* EXCITATION* ATOMIC ENERGY LEVELS* QUANTUM MECHANICS* ELECTRON TRANSITIONS.) SHOCK WAVES* SOLAR ATMOSPHERE* STARS.
INSTITUTE FOR MOLECULAR PHYSICS* U. OF MARYLAND* COLLEGE PARK.
AD-274 073 62-3-1 DIV. 25

***CYLINDRICAL BODIES**

(*CYLINDRICAL BODIES* THICKNESS* *ELASTIC SHELLS* STRESSES* PRESSURE.) (*PERTURBATION THEORY* *NONLINEAR SYSTEMS* RELIABILITY.)
COLUMBIA U.* NEW YORK.
AD-274 045 62-3-1 DIV. 25

(*STRESSES* SURFACES* *CYLINDRICAL BODIES* PRESSURE* VISCOSITY* ELASTIC SHELLS.) (DIGITAL COMPUTERS* COMPUTER LOGIC.)
COLUMBIA U.* NEW YORK.
AD-274 046 62-3-1 DIV. 25

(*SHEETS AND *CYLINDRICAL BODIES* *DRAG IN A *SUPERSONIC FLOW* *CONTINUUM MECHANICS* *MOLECULES* GAS FLOW* VISCOSITY.) (HEAT TRANSFER* *SUPERAERODYNAMICS* MACH NUMBER.)
INSTITUTE OF ENGINEERING RESEARCH* U. OF CALIF.* BERKELEY.
AD-274 388 62-3-1 DIV. 9

***DATA PROCESSING SYSTEMS**

(*DATA PROCESSING SYSTEMS* *DIGITAL COMPUTERS* *CODING* PROGRAMMING.) (COMPUTER LOGIC* MATHEMATICAL LOGIC* TABLES.)
DAVID TAYLOR MODEL BASIN* WASHINGTON* D. C.
AD-274 130 62-3-1 DIV. 30

(*DOPPLER RADAR* RADAR PULSES* RADAR REFLECTIONS* RANGE FINDING* DISPLAY SYSTEMS* *DATA PROCESSING SYSTEMS* RADAR EQUIPMENT* ELECTRONIC CIRCUITS* DESIGN.) (RADAR SIGNALS* *VIDEO SIGNALS* *FREQUENCY ANALYZERS* SWEEP GENERATORS* STORAGE TUBES* MODULATORS* OPTICAL SYSTEMS* TIMING CIRCUITS* *ULTRASONICS* IMAGE CONVERTER TUBES* TESTS.) (RADAR RECEIVERS* RADAR RANGE COMPUTERS.)
APPLIED PHYSICS LAB.* JOHNS HOPKINS U.* SILVER SPRING* MD.
AD-274 156 62-3-1 DIV. 6

(*DATA PROCESSING SYSTEMS* LEARNING* *CLASSIFICATION* COMPUTERS.) (SONAR EQUIPMENT* TARGET POSITION INDICATORS* *COMPUTER LOGIC* ERRORS* TEST METHODS.)
NAVAL ORDNANCE LAB.* WHITE OAK* MD.
AD-274 260 62-3-1 DIV. 3

(*ANTIAIRCRAFT DEFENSE SYSTEMS* AIRCRAFT* FLIGHT PATHS* DETECTION BY SCATTERING OF RADIO WAVES DURING FLIGHT OVER *RADIO COMMUNICATION SYSTEMS* TESTS.) (RADIO SIGNALS* *DATA PROCESSING SYSTEMS.) (RADIO TRANSMISSION* RADIO INTERFERENCE* WAVE TRANSMISSION* AMPLITUDE MODULATION* FREQUENCY MODULATION* PROPAGATION.)
BENDIX SYSTEMS DIV.* BENDIX CORP.* ANN ARBOR* MICH.
AD-274 282 62-3-1 DIV. 6

(*DATA PROCESSING SYSTEMS* EFFECTIVENESS* *RELIABILITY.) (*STATISTICAL PROCESSES* *TIME* PROBABILITY.)
DAVID TAYLOR MODEL BASIN* WASHINGTON* D. C.
AD-274 380 62-3-1 DIV. 30

***DATA STORAGE SYSTEMS**

(*ORGANIC COMPOUNDS* MONOCYCLIC COMPOUNDS* POLYCYCLIC COMPOUNDS* INFORMATION THEORY* *CODING* COMPUTERS* *DATA STORAGE SYSTEMS* DOCUMENTATION.) *MOLECULAR STRUCTURE.
AMERICAN CHEMICAL SOCIETY* WAHINGTON* D. C.
AD-274 388 62-3-1 DIV. 32

***DATA TRANSMISSION SYSTEMS**

(*COMMUNICATION SYSTEMS* *DATA TRANSMISSION SYSTEMS* DIGITAL SYSTEMS* PHASE MODULATION* DETECTORS* ELECTRONIC CIRCUITS* ELECTRICAL NETWORKS* DESIGN* TESTS.) (TELEPHONE LINES* VOICE COMMUNICATION SYSTEMS* CIRCUITS.) (*MODULATORS* AMPLITUDE MODULATION* PHASE SHIFTERS* CIRCUITS* PULSE GENERATORS* RECTIFIERS* OSCILLATORS* PULSE AMPLIFIERS* DESIGN* TESTS.)
INTERNATIONAL BUSINESS MACHINES CORP.* ROCKVILLE* MD.
AD-274 094 62-3-1 DIV. 5

***DECABORANES**

(*DECABORANES* *MOLECULAR STRUCTURE* POLARIZATION* ATOMIC ORBITALS* DIPOLE MOMENTS* MATHEMATICAL ANALYSIS.)
BOEING SCIENTIFIC RESEARCH LABS.* SEATTLE* WASH.
AD-274 090 62-3-1 DIV. 4

***DECONTAMINATION**

(*RESPIRATION* CLOSED-CYCLE ECOLOGICAL SYSTEMS* OXYGEN* METABOLISM.) (*WATER VAPOR* DISPOSAL AND RECOVERY* CARBON DIOXIDE* ADSORPTION.) (FREEZE DRYING* DEHYDRATION* *DECONTAMINATION* FEASIBILITY STUDIES.)
AIRESEARCH MFG. CO.* LOS ANGELES* CALIF.
AD-274 141 62-3-1 DIV. 16

(RADIOACTIVE FALL-OUT* SIMULATION* *RADIOLOGICAL CONTAMINATION* SEAWATER* NUCLEAR WEAPONS* DETONATION* CONTAMINATION* SHIP DECKS.) (*SHIPS* SHIP PLATES* *DECONTAMINATION* ARTIFICIAL RADIOACTIVITY* LABORATORIES* TEST FACILITIES* TEST METHODS* TESTS.)
NAVAL RADIOLOGICAL DEFENSE LAB.* SAN FRANCISCO* CALIF.
AD-274 167 62-3-1 DIV. 20

(*ARCTIC REGIONS* *DECONTAMINATION* *RADIOACTIVE FALL-OUT.) (MILITARY FACILITIES* CONTAMINATION* TRACER STUDIES* SIMULATION* EXPERIMENTAL DATA* EFFECTIVENESS.)
NUCLEAR DEFENSE LAB.* ARMY CHEMICAL CENTER* MD.
AD-274 299 62-3-1 DIV. 20

(*WATER SUPPLIES* *WATER* *DECONTAMINATION* CHEMICAL WARFARE AGENTS* BIOLOGICAL WARFARE AGENTS* RADIOLOGICAL WARFARE AGENTS.) (DETECTION* PURIFICATION* SANITARY ENGINEERING* WATER FILTERS* DECONTAMINATION KITS* PROTECTIVE CLOTHING.)
ARMY ENGINEER RESEARCH AND DEVELOPMENT LABS.* FORT BELVOIR* VA.
AD-274 300 62-3-1 DIV. 3

***DEFORMATION**

(*ALUMINUM* *SINGLE CRYSTALS* *DEFORMATION* ELASTICITY* PLASTICITY* MECHANICAL PROPERTIES* LOW TEMPERATURE RESEARCH* HIGH TEMPERATURE RESEARCH* PHOTOGRAPHIC ANALYSIS* MICROPHOTOGRAPHY.)
JOHNS HOPKINS U.* BALTIMORE* MD.
AD-274 107 62-3-1 DIV. 25

(*ALUMINUM* *MAGNESIUM* *IRON* *SINGLE CRYSTALS* *DEFORMATION* STRESSES* SHEAR STRESSES* PLASTIC FLOW* THEORY* PREPARATION.)
NOTRE DAME U.* IND.
AD-274 116 62-3-1 DIV. 25

***DESIGN**

(FREQUENCY MODULATION* *INVERTER CIRCUITS* DESIGN* RECTIFIERS FOR *POWER SUPPLIES* DIRECT CURRENT.) (POWER* *MODULATORS* *SWITCHING CIRCUITS* ELECTRONIC SWITCHES.) (SILICONES* SEMICONDUCTORS* RESISTORS* NONLINEAR SYSTEMS* SOLID STATE PHYSICS* ELECTRONIC CIRCUITS.)
ADVANCED ELECTRONICS CENTER* GENERAL ELECTRIC CO.* ITHACA* N. Y.
AD-274 051 62-3-1 DIV. 7

***DETECTION**

(CORROSIVE GASES; *DETECTION; *CORROSION; THIN FILMS; METAL FILMS; SPECIFICATIONS; MILITARY REQUIREMENTS.) VAPORS; ACIDS; HUMIDITY; CONTROL SYSTEMS; PACKAGING; STORAGE; *ENCLOSURES; CONTAINERS.
PACKARD COMP., ANAHEIM, CALIF.
AD-274 068 62-3-1 DIV. 17

(*RADIO SIGNALS; *DETECTION; SIGNAL-TO-NOISE RATIO; CORRELATION TECHNIQUES.) (*STATISTICAL PROCESSES; PROBABILITY; STATISTICAL ANALYSIS; MATRIX ALGEBRA; INTEGRAL TRANSFORMS; *STATISTICAL TESTS.)
BROWN U., DIV. OF APPLIED MATHEMATICS, PROVIDENCE, R. I.
AD-274 202 62-3-1 DIV. 6

***DETONATION**

(*SOLID ROCKET PROPELLANTS; ROCKET OXIDIZERS; ROCKET FUELS; BINDERS; PROPELLANT GRAINS; COMBUSTION; *DETONATION; *DETONATION WAVES; MATHEMATICAL ANALYSIS; EQUATIONS; COMPUTERS; THEORY.) (*TNT; DETONATION;) COMBUSTION CHAMBER GASES; PRESSURE; EQUATIONS OF STATE; VOLUME.
AERONUTRONIC, NEWPORT BEACH, CALIF.
AD-274 144 62-3-1 DIV. 10

***DETONATION WAVES**

(*SOLID ROCKET PROPELLANTS; ROCKET OXIDIZERS; ROCKET FUELS; BINDERS; PROPELLANT GRAINS; COMBUSTION; *DETONATION; *DETONATION WAVES; MATHEMATICAL ANALYSIS; EQUATIONS; COMPUTERS; THEORY.) (*TNT; DETONATION;) COMBUSTION CHAMBER GASES; PRESSURE; EQUATIONS OF STATE; VOLUME.
AERONUTRONIC, NEWPORT BEACH, CALIF.
AD-274 144 62-3-1 DIV. 10

***DIELECTRIC PROPERTIES**

(*DIELECTRIC PROPERTIES; ELECTRONICS.) (*LUMINESCENCE; THERMAL DIFFUSION; GLOW DISCHARGES; LIGHT TRANSMISSION.) (SPECTROGRAPHIC CAMERAS; TEST EQUIPMENT.)
NATIONAL ELECTROTECHNICAL INST. (ITALY).
AD-274 007 62-3-1 DIV. 25

***DIELECTRICS**

(*ELECTROMAGNETIC WAVES; PROPAGATION; *WAVEGUIDES, *DIELECTRICS.) (FREQUENCY MULTIPLIERS; SCATTERING; BOUNDARY LAYERS; PERIODIC VARIATIONS; FUNCTIONS; CYLINDRICAL BODIES.)
ANTENNA LAB., CALIF. INST. OF TECH., PASADENA.
AD-273 988 62-3-1 DIV. 25

***DIES**

(HIGH TEMPERATURE RESEARCH; *FORGING; *DIES FOR REFRACTORY MATERIALS; METALS; CERAMIC MATERIALS; CERMETS; INTERMETALLIC COMPOUNDS; DESIGN.) (MATERIALS; HEAT RESISTANT ALLOYS; TITANIUM COMPOUNDS; BORIDES; SILICON COMPOUNDS; CARBIDES; TANTALUM COMPOUNDS; BERYLLIUM COMPOUNDS; ALUMINUM COMPOUNDS; OXIDES; GRAPHITE; OXIDATION; MECHANICAL PROPERTIES; STRESSES; GRAPHITE COMPOUNDS; SILICON;) ALLOYS; MOLYBDENUM ALLOYS; TUNGSTEN ALLOYS; NIOBIUM ALLOYS; NICKEL ALLOYS; CHROMIUM ALLOYS.
ARMOUR RESEARCH FOUNDATION; CHICAGO, ILL.
AD-274 199 62-3-1 DIV. 26

(HYDROSTATIC PRESSURE; *EXTRUSION; *STEEL; *TITANIUM ALLOYS; ALUMINUM ALLOYS; VANADIUM ALLOYS.) (*MACHINE TOOLS; HYDRAULIC PRESSES; DESIGN.) (HIGH PRESSURE RESEARCH; *DIES; HYDRAULIC FLUIDS; HYDRAULIC SEALS; METAL SEALS; RUBBER SEALS;) (STRESSES; MATHEMATICAL ANALYSIS; SHEAR STRESSES.)
BATTELLE MEMORIAL INST., COLUMBUS.
AD-274 372 62-3-1 DIV. 26

***DIFFERENCE EQUATIONS**

(*AERODYNAMIC CONFIGURATIONS; *LAMINAR BOUNDARY LAYER; *COMPRESSIBLE FLOW; SUBSONIC FLOW; SUPERSONIC FLOW; *HYPERSONIC FLOW; VISCOSITY.) (*BOUNDARY LAYER; *EQUATIONS; *NUMERICAL ANALYSIS; *DIFFERENTIAL EQUATIONS; *DIFFERENCE EQUATIONS; *PARTIAL DIFFERENTIAL EQUATIONS;) (SHEETS (FLAT PLATES); SHEAR STRESSES; HEAT TRANSFER; STABILITY; SHOCK WAVES.)
STANFORD U., CALIF.
AD-273 983 62-3-1 DIV. 9

(*ERRORS; ESTIMATION OF A FINITE DIFFERENCE ANALOGUE OF *GREEN'S FUNCTION FOR ELLIPTIC EQUATIONS; *PARTIAL DIFFERENTIAL EQUATIONS;) (OPERATORS (MATHEMATICS); REAL NUMBERS; *DIFFERENCE EQUATIONS;)
INSTITUTE FOR FLUID DYNAMICS AND APPLIED MATHEMATICS, U. OF MARYLAND, COLLEGE PARK.
AD-274 319 62-3-1 DIV. 13

***DIFFERENTIAL EQUATIONS**

(*AERODYNAMIC CONFIGURATIONS; *LAMINAR BOUNDARY LAYER; *COMPRESSIBLE FLOW; SUBSONIC FLOW; SUPERSONIC FLOW; *HYPERSONIC FLOW; VISCOSITY.) (*BOUNDARY LAYER; *EQUATIONS; *NUMERICAL ANALYSIS; *DIFFERENTIAL EQUATIONS; *DIFFERENCE EQUATIONS; *PARTIAL DIFFERENTIAL EQUATIONS;) (SHEETS (FLAT PLATES); SHEAR STRESSES; HEAT TRANSFER; STABILITY; SHOCK WAVES.)
STANFORD U., CALIF.
AD-273 983 62-3-1 DIV. 9

(SYNTHESIS OF *LINEAR SYSTEMS (NONSTATIONARY); *FEEDBACK SYSTEMS;) (*CONTROL SYSTEMS; ALGEBRA; *DIFFERENTIAL EQUATIONS; TIME; FUNCTIONS; POLYNOMIALS; TRANSFORMATIONS (MATHEMATICS); OPERATORS (MATHEMATICS);)
CALIFORNIA U., LOS ANGELES.
AD-274 231 62-3-1 DIV. 8

***DIFFUSERS**

(*DIFFUSERS; *BOUNDARY LAYER CONTROL BY AREA SUCTION IN TURBOJET INLETS; RAMJET INLETS OF TURBOJET ENGINES; RAMJET ENGINES.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON, D. C.
AD-274 329 62-3-1 DIV. 27

***DIFFUSION**

(*GAS IONIZATION; PLASMA PHYSICS; *MAGNETIC PINCH; IONS; *DIFFUSION; MAGNETIC FIELDS.) FLUID MECHANICS,
MAGNETOGASDYNAMICS LAB., MASS. INST. OF TECH., CAMBRIDGE.
AD-274 166 62-3-1 DIV. 25

***DIGITAL COMPUTERS**

(*DATA PROCESSING SYSTEMS; *DIGITAL COMPUTERS; *CODING; PROGRAMMING.) (COMPUTER LOGIC; MATHEMATICAL LOGIC; TABLES.)
DAVID TAYLOR MODEL BASIN, WASHINGTON, D. C.
AD-274 138 62-3-1 DIV. 30

(*DIGITAL COMPUTERS; *FLIGHT SIMULATORS; *TRAINING DEVICES; STANDARDIZATION OF SIMULATION; AIRCRAFT; FLAPS; PNEUMATIC SYSTEMS; HYDRAULIC SYSTEMS; TURBOJET ENGINES; FUEL SYSTEMS; LANDING GEAR; ELECTRICAL EQUIPMENT OF JET PLANES; JET BOMBERS; ATTACK BOMBERS; JET FIGHTERS; PATROL PLANES.) (AUTOMATIC PROGRAMMING; MATHEMATICAL LOGIC.)
GOODYEAR AIRCRAFT CORP., AKRON, OHIO.
AD-274 179 62-3-1 DIV. 30

***DIODES**

(*ELECTRONICS; *TEXTBOOKS; USSR.) (ELECTRON TUBES, AMPLIFIERS; RADIO RECEIVERS; RADIO TRANSMITTERS.) (ELECTRON TUBES; SUPERHIGH FREQUENCY.) ELECTRONS; THEORY; *ELECTRON OPTICS; THERMIONIC EMISSION; PHOTOEMISSION; *CATHODES; OXIDE CATHODES; *DIODES; *TRIODES; TETRODES; PENTODES; *ELECTRON TUBES; FREQUENCY CONVERTERS; *SEMICONDUCTORS; *CATHODE RAY TUBES; KLYSTRONS; MAGNETRONS; TRAVELING WAVE TUBES; *PHOTOTUBES; PHOTOMULTIPLIERS; X RAYS; ELECTRON TUBES.
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 063 62-3-1 DIV. 8

(*COMPUTER LOGIC; *TRIGGERED GATES; TRANSISTORS; *DIODES; DELAY CIRCUITS;) DIGITAL COMPUTERS; *MEMORY DEVICES; PROGRAMMING.
RCA INDUSTRIAL ELECTRONIC PRODUCTS, CAMDEN, N. J.
AD-274 177 62-3-1 DIV. 30

(*DIODES; GALLIUM COMPOUNDS; ARSENIDES;) (*COMPUTER LOGIC; TRIGGER CIRCUITS;) MEMORY DEVICES; TRIGGERED GATES.
RCA INDUSTRIAL ELECTRONIC PRODUCTS, CAMDEN, N. J.
AD-274 179 62-3-1 DIV. 30

(*SEMICONDUCTORS; *DIODES; *OSCILLATORS; *RADIOFREQUENCY OSCILLATIONS; THEORY; MATHEMATICAL ANALYSIS; NON-LINEAR DIFFERENTIAL EQUATIONS.)
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY.
AD-274 236 62-3-1 DIV. 8

(*SEMICONDUCTORS; *PARAMETRIC AMPLIFIERS; *MICROWAVE AMPLIFIERS; *DIODES; DESIGN FOR HELIXES; PARAMETRIC AMPLIFIERS; DISTRIBUTED AMPLIFIERS WITH COAXIAL CABLES; MICROWAVE OSCILLATORS; EXTREMELY HIGH FREQUENCY; *FREQUENCY MULTIPLIERS;) (AMPLIFIERS; GERMANIUM; GALLIUM COMPOUNDS; ANTIMONIDES; DESIGN; THEORY; NOISE (RADIO); NOISE (RADAR);) (AMPLIFIERS WITH NEGATIVE RESISTANCE CIRCUITS; TRANSMISSION LINES; HALL EFFECT; SOLID STATE PHYSICS.) (*FREQUENCY SHIFT CONVERTERS; ULTRA HIGH FREQUENCY; S BAND; ELECTRONIC CIRCUITS; *MICROWAVE EQUIPMENT; NONLINEAR SYSTEMS; PUMPS; THEORY; MATHEMATICAL ANALYSIS;)
DAVID SARNOFF RESEARCH CENTER, PRINCETON, N. J.
AD-274 340 62-3-1 DIV. 8

(*DIODES; INTERMETALLIC COMPOUNDS; *GALLIUM COMPOUNDS; *ARSENIDES; *PHOSPHIDES; *NOISE (RADIO); MEASUREMENT;) (CRYSTALS; GROWTH; METALLIC COMPOUNDS; VAPORS; TRANSPORT PROPERTIES; CHEMICAL IMPURITIES; LOW TEMPERATURE RESEARCH;) (ELECTRIC INSULATION; CONDUCTIVITY; SPACE CHARGES; TESTS;) (GOLD ALLOYS; ANTIMONY ALLOYS; GERMANIUM ALLOYS; TIN ALLOYS; SILVER ALLOYS; TELLURIUM ALLOYS;)
GENERAL ELECTRIC CO., SYRACUSE, N. Y.
AD-274 390 62-3-1 DIV. 8

(*DIODES; *SEMICONDUCTORS; HIGH TEMPERATUME RESEARCH; CRYSTALS; GROWTH; ELECTRONS; DIFFUSION; SOLUBILITY; MEASUREMENT; ELECTROPLATING; GAMMA RAYS;) (*GALLIUM COMPOUNDS; ARSENIDES; COPPER; GERMANIUM; SILICON; POTASSIUM; ALUMINUM;)
GENERAL ELECTRIC CO., SYRACUSE, N. Y.
AD-274 391 62-3-1 DIV. 8

***DISPLAY SYSTEMS**

(*TRACKING; TESTS; ROTOR ATTITUDE INDICATORS; FLIGHT ATTITUDE INDICATORS;) (*DISPLAY SYSTEMS; FLIGHT INSTRUMENTS; CONFIGURATION; CONTROL STICKS; INSTRUMENT PANELS; HELICOPTERS; SIMULATION;) (VISUAL PERCEPTION; HUMAN ENGINEERING;)
BELL HELICOPTER CO., FORT WORTH, TEX.
AD-273 987 62-3-1 DIV. 1

***DISSOCIATION**

(ORGANIC COMPOUNDS; ALKYL RADICALS; *SULFIDES; *THIOLS; PHOTOLYSIS; *DISSOCIATION; CHEMICAL BONDS; ENERGY; REACTION KINETICS; CHEMICAL REACTIONS; *RECOMBINATION REACTIONS; DISPROPORTIONATION; THERMOCHEMISTRY; *FREE RADICALS;) PHOTOCHEMICAL REACTIONS; SPECTROGRAPHIC ANALYSIS; LOW TEMPERATURE RESEARCH.
LUND U. (SWEDEN).
AD-274 252 62-3-1 DIV. 4

***DOPPLER RADAR**

(*DOPPLER RADAR; RADAR PULSES; RADAR REFLECTIONS; RANGE FINDING; DISPLAY SYSTEMS; *DATA PROCESSING SYSTEMS; RADAR EQUIPMENT; ELECTRONIC CIRCUITS; DESIGN;) (RADAR SIGNALS; *VIDEO SIGNALS; *FREQUENCY ANALYZERS; SWEEP GENERATORS; STORAGE TUBES; MODULATORS; OPTICAL SYSTEMS; TIMING CIRCUITS; *ULTRASONICS; IMAGE CONVERTER TUBES; TESTS;) (RADAR RECEIVERS; RADAR RANGE COMPUTERS.)
APPLIED PHYSICS LAB., JOHNS HOPKINS U., SILVER SPRING, MD.
AD-274 156 62-3-1 DIV. 6

***DOPPLER TRACKING**

(*WIND; MEASUREMENT; INSTRUMENTATION; FEASIBILITY STUDIES;) (TURBULENCE; RADAR; *DOPPLER TRACKING;) (RADAR; DOPPLER TRACKING; *ACOUSTIC DETECTORS;) (AIR; HEAT; BUBBLES; *INFRARED TRACKING;)
MIDWEST RESEARCH INST., KANSAS CITY, MO.
AD-274 284 62-3-1 DIV. 2

(*SUPERAERODYNAMICS; *DRAG OF AIRFOILS IN SUPERSONIC FLOW; GASES; DISSOCIATION;) (THERMODYNAMICS; EQUATIONS OF STATE; CHEMICAL EQUILIBRIUM; ENTROPY;)
RENSSELAER POLYTECHNIC INST., TROY, N. Y.
AD-274 317 62-3-1 DIV. 25

(*SHEETS AND *CYLINDRICAL BODIES; *DRAG IN A *SUPERSONIC FLOW; *CONTINUUM MECHANICS; *MOLECULES; GAS FLOW; VISCOSITY;) (HEAT TRANSFER; *SUPERAERODYNAMICS; MACH NUMBER;)
INSTITUTE OF ENGINEERING RESEARCH, U. OF CALIF., BERKELEY.
AD-274 385 62-3-1 DIV. 9

***DRAG**

(*GUIDED MISSILES; EXHAUST GASES OR *CONDENSATION TRAILS OF *LIGHT AND *LUMINESCENCE WITH RESPECT TO VELOCITY AND DISTANCE OF *PARTICLES EJECTED IN *UPPER ATMOSPHERE;) (AERODYNAMICS; *DRAG; GRAVITY; DIFFERENTIAL EQUATIONS; INTEGRATION; TABLES;)
GEOPHYSICS CORP. OF AMERICA, BEDFORD, MASS.
AD-273 972 62-3-1 DIV. 25

***DROPS**

(*ELECTRIC FIELDS PHENOMENA ASSOCIATED WITH *AEROSOLS; ELECTRONS; *PARTICLES;) (*DROPS; EVAPORATION; VOLTAGE; WATER; SURFACE TENSION; ELECTRICAL PROPERTIES; ELECTROSTATIC PRECIPITATION;) (SPRAY NOZZLES; ATOMIZATION; SCATTERING;)
LITTLE, ARTHUR D., INC., CAMBRIDGE, MASS.
AD-274 247 62-3-1 DIV. 25

***DUCTS**

(*FLYING PLATFORMS; GROUND EFFECT; DESIGN;) (INDUCTION SYSTEMS; DUCT INLETS; *SHROUDED PROPELLERS; DUCTED FANS; *DUCTS; CONFIGURATION; AERODYNAMICS;) (NOZZLES; GAS FLOW; JETS; VELOCITY; THRUST; PRESSURE; EFFECTIVENESS; MATHEMATICAL ANALYSIS;)
KELLETT AIRCRAFT CORP., PHILADELPHIA, PA.
AD-274 159 62-3-1 DIV. 1

***DYNAMICS**

(SATELLITE VEHICLES; ORBITAL FLIGHT PATHS; *SATELLITE VEHICLE TRAJECTORIES; *DYNAMICS; CELESTIAL MECHANICS; PERTURBATION THEORY; MATHEMATICAL ANALYSIS; THEORY; EQUATIONS; DIFFERENTIAL EQUATIONS;) (DIGITAL COMPUTERS; PROGRAMMING.)
LAND-AIR, INC., POINT MUGU, CALIF.
AD-274 108 62-3-1 DIV. 12

***ELASTIC SHELLS**

(*CYLINDRICAL BODIES; THICKNESS; *ELASTIC SHELLS; STRESSES; PRESSURE.) (*PERTURBATION THEORY; *NONLINEAR SYSTEMS; RELIABILITY.)
COLUMBIA U., NEW YORK.
AD-274 045 62-3-1 DIV. 25

***ELASTICITY**

(BEARINGS; *BALL BEARINGS; *ROLLER BEARINGS; LUBRICATION; FATIGUE (MECHANICS).) (*LUBRICATION; *ELASTICITY; DEFORMATION; *HYDRODYNAMICS, THEORY.) (FILMS; ELECTRICAL CONDUCTANCE; X-RAY SPECTROSCOPY.) (SURFACES; FAILURE (MECHANICS); METALS; TRANSPORT PROPERTIES; TRACER STUDIES.) TEST EQUIPMENT; LUBRICANTS.
SKF INDUSTRIES, INC., PHILADELPHIA, PA.
AD-274 137 62-3-1 DIV. 26

(*THERMODYNAMICS; *THEORY OF *ELASTICITY; VISCOSITY; *RELAXATION TIME.) (*IRREVERSIBLE PROCESSES; MATRIX ALGEBRA; INTEGRAL TRANSFORMS.)
NORTH CAROLINA STATE COLL., RALEIGH.
AD-274 248 62-3-1 DIV. 25

***ELASTOMERS**

(COMPATIBILITY OF *PLASTICS; *ELASTOMERS; FLUOROCARBONS; SYNTHETIC RUBBER; BUTYL RUBBER WITH *ALKALI METALS; LIQUID METALS; SODIUM; POTASSIUM; RUBIDIUM; CONTAMINATION; DETERIORATION; TEST METHODS; HIGH TEMPERATURE RESEARCH.) (PHYSICAL PROPERTIES; MECHANICAL PROPERTIES; TENSILE PROPERTIES.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON, D. C.
AD-274 171 62-3-1 DIV. 14

(*ELASTOMERS; *POLYMERS; *URETHANES; RADIATION EFFECTS; GAMMA RAYS; NEUTRON BOMBARDMENT; DOSAGE; TEMPERATURE; HIGH TEMPERATURE RESEARCH; LOW TEMPERATURE RESEARCH; STRESSES; MECHANICAL PROPERTIES; TENSILE PROPERTIES; THEORY.) *VULCANIZATES.
GENERAL DYNAMICS/FORT WORTH; TEX.
AD-274 331 62-3-1 DIV. 14

***ELECTRIC DETONATORS**

(*ELECTRIC DETONATORS; *ELECTRIC IGNITERS; *RADIOFREQUENCY ATTENUATORS; ELECTROMAGNETIC WAVES; HAZARDS; BROADBAND; ABSORPTION; ATTENUATION; MEASUREMENT; MATERIALS; DESIGN.) (LOW FREQUENCY; RADIOFREQUENCY ATTENUATORS; MEASUREMENT; MATHEMATICAL ANALYSIS.) FERRITES; IRON COMPOUNDS; CARBONYL RADICALS; POWDERS; DIELECTRICS; RADIOFREQUENCY FILTERS; PHOSPHORS; OXIDES; ZINC COMPOUNDS; COPPER CATALYSTS; LUMINESCENT MATERIALS; PHOTOSENSITIVITY; RESISTORS.
LABORATORIES FOR RESEARCH AND DEVELOPMENT; FRANKLIN INST., PHILADELPHIA, PA.
AD-274 239 62-3-1 DIV. 8

(*WIRE; TUNGSTEN WIRE; THIN FILMS; *DETONATION; PHOTOGRAPHIC ANALYSIS; *HIGH SPEED PHOTOGRAPHY; MOTION PICTURE CAMERAS; ALUMINUM; METAL FILMS; *ELECTRIC DETONATORS; ELECTRIC DISCHARGES; ENERGY.)
AEROJET-GENERAL CORP., DOWNEY, CALIF.
AD-274 293 62-3-1 DIV. 22

***ELECTRIC DISCHARGES**

(*HELICOPTERS; REDUCTION OF *STATIC ELECTRICITY BY *ELECTRIC DISCHARGES; ELECTRICAL CORONA; MATHEMATICAL ANALYSIS.) (HELICOPTERS; HAZARDS; *AVIATION SAFETY; ANALYSIS; COUNTERMEASURES.) (ATMOSPHERE; ATMOSPHERICS; ELECTRICAL PROPERTIES.)
PRINCETON U., N. J.
AD-273 976 62-3-1 DIV. 1

(ELECTRIC ARCS; *ELECTRIC DISCHARGES; SPARKS; LIGHTNING.) (*ELECTRIC POWER PRODUCTION; TRANSMISSION; DIRECT CURRENT.) USSR.
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND; WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 062 62-3-1 DIV. 7

***ELECTRIC FIELDS**

(DRIFT OF *ELECTRONS AND *PROTONS IN MAGNETIC FIELDS OF EARTH.) (*TERRESTRIAL MAGNETISM; SOLAR FLARES.) (AURORAE; *ELECTRIC FIELDS AND SPACE CHARGES IN ATMOSPHERE.)
RAND CORP., SANTA MONICA, CALIF.
AD-274 182 62-3-1 DIV. 2

(*ELECTRIC FIELDS PHENOMENA ASSOCIATED WITH *AEROSOLS, ELECTRONS, *PARTICLES.) (*DROPS; EVAPORATION; VOLTAGE; WATER; SURFACE TENSION; ELECTRICAL PROPERTIES; ELECTROSTATIC PRECIPITATION.) (SPRAY NOZZLES; ATOMIZATION; SCATTERING.)
LITTLE, ARTHUR D., INC., CAMBRIDGE, MASS.
AD-274 247 62-3-1 DIV. 25

(*ELECTRON GUNS; THEORY; DESIGN; TESTS WITH *ELECTRON BEAMS ACROSS *MAGNETIC FIELDS; *ELECTRIC FIELDS.) (MICROWAVE EQUIPMENT; OPTICAL SYSTEMS.) ELECTRON BEAMS; STABILITY; *SPACE CHARGES; *FOCUSING; ELECTRODES; CATHODES (ELECTRON TUBES); *ELECTRON TUBES; MATHEMATICAL ANALYSIS; DIRECT CURRENT; MEASUREMENT.
MICROWAVE LAB., STANFORD U., CALIF.
AD-274 256 62-3-1 DIV. 8

***ELECTRIC POWER PRODUCTION**

(SOLID STATE PHYSICS; *SOLAR CELLS; *GENERATORS; DESIGN.) (*PHOTOELECTRIC CELLS; METALS AND *SEMICONDUCTORS; CADMIUM COMPOUNDS; SULFIDES; *PHOTOCONDUCTIVITY; *ELECTRIC POWER PRODUCTION.)
GIANNINI CONTROLS CORP., PASADENA, CALIF.
AD-273 974 62-3-1 DIV. 7

(*GENERATORS; AUXILIARY POWER PLANTS; *THERMOELECTRICITY; *ISOTOPES; HEAT TRANSFER; HEAT EXCHANGERS; COOLING; MANUFACTURING METHODS.) (POWER PLANTS; POWER SUPPLIES; *ELECTRIC POWER PRODUCTION; *NUCLEAR POWER PLANTS; THERMAL CONDUCTIVITY; THERMOCOUPLES; IMPEDANCE MATCHING; TESTS.)
WESTINGHOUSE ELECTRIC CORP., CHESWICK, PA.
AD-274 280 62-3-1 DIV. 7

***ELECTRIC WELDING**

(*CASTINGS; MOLDING; MANUFACTURING METHODS; ROLLING MILLS; *SHEETS, METALS; ALLOYS; LIQUID METALS; STEEL; IRON.) (*ELECTRIC WELDING; *ARC WELDING; *WELDING; ELECTRON BEAMS; AUTOMATIC; PRESSURE; VIBRATION; ULTRASONICS; SLAGS.) USSR.
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND; WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 120 62-3-1 DIV. 26

***ELECTRICAL CORONA**

(*PRINTED CIRCUITS; *ELECTRICAL CORONA; ELECTRIC ARCS; ELECTRIC DISCHARGES; FAILURE (MECHANICS); TESTS; DIELECTRICPROPERTIES.) (ELECTRONIC CIRCUITS; *CIRCUITS; *CONDUCTORS; TEST EQUIPMENT; HIGH ALTITUDE; HIGH TEMPERATURE RESEARCH; HUMIDITY; TESTS.) (AIRBORNE; ELECTRONIC EQUIPMENT; NAVAL EQUIPMENT; AVIATION SAFETY; SAFETY.)
NAVAL AVIONICS FACILITY, INDIANAPOLIS, IND.
AD-273 958 62-3-1 DIV. 8

***ELECTRICAL NETWORKS**

(*ELECTRICAL NETWORKS; SYNTHESIS; RELIABILITY.) (MATHEMATICAL ANALYSIS; *ANALYSIS OF VARIANCE; BINOMIALS.)
BOEING SCIENTIFIC RESEARCH LABS., SEATTLE, WASH.
AD-273 968 62-3-1 DIV. 8

(*ELECTRICAL NETWORKS; *SYNTHESIS; REFLECTION; POLYNOMIALS.) (RESISTORS; CAPACITORS.)
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY.
AD-274 306 62-3-1 DIV. 7

***ELECTRIC PROPULSION**

(*ELECTRIC PROPULSION; PLASMA JETS; ROCKET MOTORS; *ION ROCKETS; PRESSURE; SPECIFIC IMPULSE; THRUST; TESTS.) (IONS OF ARGON; OXYGEN.) (EXHAUST GASES; SPECTROGRAPHIC ANALYSIS; TEST METHODS; PHOTOELECTRIC EFFECT.) PLASMA PHYSICS.
SPACE SCIENCES LAB., GENERAL ELECTRIC CO., PHILADELPHIA, PA.
AD-274 217 62-3-1 DIV. 27

***ELECTROCHEMISTRY**

(*GUIDED MISSILE BATTERIES; DESIGN; SPACESHIPS; SATELLITE VEHICLES; *POWER SUPPLIES.) (*LIQUID METALS; PHYSICAL PROPERTIES; CHEMICAL PROPERTIES; ELECTRICAL PROPERTIES; POTASSIUM; MERCURY; POTASSIUM ALLOYS; MERCURY ALLOYS; ELECTRODES.) (SALTS; POTASSIUM COMPOUNDS; HYDROXIDES; BROMIDES; IODIDES; ELECTROLYTES.) (*ELECTROLYTIC CELLS; *ELECTROCHEMISTRY; THEORY; ALKALINE CELLS.) (BATTERY COMPARTMENTS; MATERIALS; STEEL; STAINLESS STEEL; TUNGSTEN; MOLYBDENUM; CHROMIUM; ALUMINUM COMPOUNDS; MAGNESIUM COMPOUNDS; PHYSICAL PROPERTIES; THERMAL EXPANSION.) ELECTRIC INSULATION; CERAMIC MATERIALS; OXIDES; BATTERY SEPARATORS.
ALLISON DIV., GENERAL MOTORS CORP., INDIANAPOLIS, IND.
AD-274 197 62-3-1 DIV. 7

***ELECTRODES**

(*HYPERSONIC WIND TUNNELS; *HEATERS; ELECTRIC ARCS; MAGNETIC FIELDS; *ELECTRODES; CONFIGURATION; CATHODES OF TUNGSTEN ALLOYS; THORIUM ALLOYS; COPPER ELECTRODES; COPPER; ANODES.) (TEST FACILITIES; RE-ENTRY AERODYNAMICS; AERODYNAMIC HEATING; SIMULATION; GAS FLOW; ELECTRIC POTENTIAL; PRESSURE.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON, D. C.
AD-274 325 62-3-1 DIV. 30

***ELECTROLYTIC CELLS**

(*FUEL CELLS.) *ELECTROLYTIC CELLS; FUELS; HYDROCARBONS; ELECTRODES; *OXYGEN ELECTRODES; HYDROGEN ELECTRODES; ION EXCHANGE; MEMBRANES; *CATALYSTS; PLATINUM; CHEMICAL REACTIONS; OXIDATION-REDUCTION REACTIONS; ELECTROCHEMISTRY; POLARIZATION; THERMODYNAMICS.) HYDROGEN; OXYGEN; LOW TEMPERATURE RESEARCH.
GENERAL ELECTRIC CO., LYNN, MASS.
AD-273 971 62-3-1 DIV. 7

(*GUIDED MISSILE BATTERIES; DESIGN; SPACESHIPS; SATELLITE VEHICLES; *POWER SUPPLIES.) (*LIQUID METALS; PHYSICAL PROPERTIES; CHEMICAL PROPERTIES; ELECTRICAL PROPERTIES; POTASSIUM; MERCURY; POTASSIUM ALLOYS; MERCURY ALLOYS; ELECTRODES.) (SALTS; POTASSIUM COMPOUNDS; HYDROXIDES; BROMIDES; IODIDES; ELECTROLYTES.) (*ELECTROLYTIC CELLS; *ELECTROCHEMISTRY; THEORY; ALKALINE CELLS.) (BATTERY COMPARTMENTS; MATERIALS; STEEL; STAINLESS STEEL; TUNGSTEN; MOLYBDENUM; CHROMIUM; ALUMINUM COMPOUNDS; MAGNESIUM COMPOUNDS; PHYSICAL PROPERTIES; THERMAL EXPANSION.) ELECTRIC INSULATION; CERAMIC MATERIALS; OXIDES; BATTERY SEPARATORS.
ALLISON DIV., GENERAL MOTORS CORP., INDIANAPOLIS, IND.
AD-274 197 62-3-1 DIV. 7

***ELECTROMAGNETIC FIELDS**

(*QUANTUM MECHANICS; IONS AND *GAS IONIZATION IN *ELECTROMAGNETIC FIELDS.) (TRANSPORT PROPERTIES; RELAXATION TIME; *QUANTUM STATISTICS; IRREVERSIBLE PROCESSES; TENSOR ANALYSIS; MAGNETIC FIELDS.)
OSLO U. (NORWAY).
AD-274 088 62-3-1 DIV. 25

***ELECTROMAGNETIC WAVES**

(ELECTRONS; DENSITY IN *PLASMA PHYSICS.) (ELECTRONS; IONS; DISSOCIATION; RECOMBINATION REACTIONS.) *ELECTROMAGNETIC WAVES; DIFFUSION.
GEOPHYSICS CORP. OF AMERICA; BEDFORD, MASS.
AD-273 973 62-3-1 DIV. 25

(*ELECTROMAGNETIC WAVES; PROPAGATION; WAVEGUIDES; *DIELECTRICS.) (FREQUENCY MULTIPLIERS; SCATTERING; BOUNDARY LAYERS; PERIODIC VARIATIONS; FUNCTIONS; CYLINDRICAL BODIES.)
ANTENNA LAB., CALIF. INST. OF TECH., PASADENA.
AD-273 988 62-3-1 DIV. 25

(*ELECTROMAGNETIC WAVES; PROPAGATION; WAVEGUIDES; MAGNETIC FIELDS. ELECTRIC CURRENTS.) (*PARTIAL DIFFERENTIAL EQUATIONS; *GREEN'S FUNCTION.) (PLASMA PHYSICS; MATHEMATICAL ANALYSIS; THESES.)
RADIATION LAB., U. OF MICHIGAN; ANN ARBOR.
AD-274 013 62-3-1 DIV. 25

(MEASUREMENT OF ABSORPTION OF *ELECTROMAGNETIC WAVES BY *PLASMA PHYSICS.) (MICROWAVE PROBES; DIODES.) COAXIAL CABLES.
RADIATION LAB., U. OF MICHIGAN; ANN ARBOR.
AD-274 014 62-3-1 DIV. 20

(ELECTROMAGNETIC WAVES; *SCATTERING; DIELECTRIC PROPERTIES; CYLINDRICAL BODIES.) (WAVE TRANSMISSION; REFLECTION; *PLASMA PHYSICS; *ELECTROMAGNETIC WAVES; PROPAGATION.) DIFFERENTIAL EQUATIONS; TABLES.
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 067 62-3-1 DIV. 25

(PARTIAL DIFFERENTIAL EQUATIONS IN IONIC CURRENT; DIPOLE MOMENTS.) (INTEGRAL EQUATIONS; NUMERICAL ANALYSIS; TRIGONOMETRY; FUNCTIONS.) (INTEGRAL TRANSFORMS; MATRIX ALGEBRA; TENSOR ANALYSIS; DIELECTRIC PROPERTIES FOR ELECTRIC CURRENTS (SOURCES).) (*ELECTROMAGNETIC WAVES; *PROPAGATION IN *PLASMA PHYSICS IN MAGNETIC FIELDS.) OPERATORS (MATHEMATICS).
ELECTRICAL ENGINEERING RESEARCH LAB., U. OF ILLINOIS; URBANA.
AD-274 083 62-3-1 DIV. 25

*ELECTRONICS; *ELECTRONIC CIRCUITS; *SOLID STATE PHYSICS; SEMICONDUCTORS; PARAMETRIC AMPLIFIERS; ELECTRICAL NETWORKS; PULSE AMPLIFIERS; TRANSISTORS; OSCILLATORS; HARMONIC OSCILLATORS; AMPLIFIERS; FEEDBACK AMPLIFIERS; TRANSMISSION LINES; *COMPUTERS; *COMPUTER LOGIC; DIGITAL COMPUTERS; PROGRAMMING; THEORY; MACHINE TRANSLATION; SPECIAL FUNCTIONS; MICROWAVE AMPLIFIERS; *MICROWAVE EQUIPMENT; *PLASMA PHYSICS; WAVEGUIDES; MICROWAVES; PROPAGATION; MAGNETRONS; CYCLOTRONS; NOISE (RADIO); SLOT ANTENNAS; ANTENNAS; *ELECTROMAGNETIC WAVES; CRYSTALS; SELENIUM; LIGHT; PULSE MODULATION; CODING; LASERS; NUCLEAR MAGNETIC RESONANCE; THIN FILMS; GARNET; CONTROL SYSTEMS; *LINEAR SYSTEMS; *NONLINEAR SYSTEMS; SEQUENCES; DELAY LINES; INFORMATIONN THEORY; INFORMATION RETRIEVAL; TELEVISION EQUIPMENT; CIRCUIT BREAKERS; INVERTER CIRCUITS.
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY.
AD-274 101 62-3-1 DIV. 8

(*PLASMA PHYSICS, *ELECTROMAGNETIC WAVES, *PROPAGATION.) PARTIAL DIFFERENTIAL EQUATIONS.
MICROWAVE PHYSICS LAB., MOUNTAIN VIEW, CALIF.
AD-274 125 62-3-1 DIV. 8

(*ELECTROMAGNETIC WAVES, *SCATTERING, PROPAGATION IN *WAVEGUIDES.) (*COMMUNICATION SYSTEMS, *WIRE, CONDUCTIVITY, *ANTENNA RADIATION PATTERNS, HELICAL ANTENNAS.)
CRUFT LAB., HARVARD U., CAMBRIDGE, MASS.
AD-274 142 62-3-1 DIV. 25

***ELECTRON ACCELERATORS**

(*ELECTRON ACCELERATORS, CAVITY RESONATORS, ELECTRIC FIELDS.) USSR.
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, *RIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 060 62-3-1 DIV. 20

***ELECTRON BEAMS**

(*BETATRONS, BEAM POWER TUBES, *ELECTRON BEAMS, FUEL INJECTION, TEST EQUIPMENT.)
NAVAL RESEARCH LAB., WASHINGTON, D. C.
AD-274 032 62-3-1 DIV. 20

(*ELECTRON GUNS, THEORY, DESIGN, TESTS WITH *ELECTRON BEAMS ACROSS *MAGNETIC FIELDS, *ELECTRIC FIELDS.) (MICROWAVE EQUIPMENT, OPTICAL SYSTEMS.) ELECTRON BEAMS, STABILITY, *SPACE CHARGES, *FOCUSING, ELECTRODES, CATHODES (ELECTRON TUBES), *ELECTRON TUBES, MATHEMATICAL ANALYSIS, DIRECT CURRENT, MEASUREMENT.
MICROWAVE LAB., STANFORD U., CALIF.
AD-274 256 62-3-1 DIV. 8

(MEASUREMENT AND ANALYSIS OF *PLASMA PHYSICS WITH *ELECTRON BEAMS.) (ELECTRON BEAMS, SCATTERING IN PLASMA PHYSICS, ARGON.)
RCA VICTOR CO., LTD. (CANADA).
AD-274 266 62-3-1 DIV. 25

***ELECTRON BOMBARDMENT**

(*AIR, *ELECTRON BOMBARDMENT, *SPECTROGRAPHIC ANALYSIS.) (ELECTRONS, SCATTERING, AIR, SECONDARY EMISSION.) SPECTROGRAPHIC DATA, *ELECTRON GUNS.
MARYLAND U., COLLEGE PARK.
AD-274 250 62-3-1 DIV. 25

***ELECTRON GUNS**

(*TRAVELING WAVE TUBES, *KLYSTRONS, *MICROWAVE AMPLIFIERS, ULTRA HIGH FREQUENCY, HELIXES, COUPLING CIRCUITS, S BAND, STANDING WAVE RATIOS, THEORY.) (AMPLIFIERS, ELECTRON TUBES, *ELECTRON GUNS, CATHODES (ELECTRON TUBES), SPACE CHARGES, NUMERICAL METHODS AND PROCEDURES, MATHEMATICAL ANALYSIS, THEORY.) (MAGNETRONS, ELECTRON BEAMS, PLASMA PHYSICS, ELECTRIC FIELDS, MAGNETIC FIELDS.)
ELECTRON PHYSICS LAB., U. OF MICHIGAN, ANN ARBOR
AD-274 110 62-3-1 DIV. 8

(*AIR, *ELECTRON BOMBARDMENT, *SPECTROGRAPHIC ANALYSIS.) (ELECTRONS, SCATTERING, AIR, SECONDARY EMISSION.) SPECTROGRAPHIC DATA, *ELECTRON GUNS.
MARYLAND U., COLLEGE PARK.
AD-274 250 62-3-1 DIV. 25

(*ELECTRON GUNS, THEORY, DESIGN, TESTS WITH *ELECTRON BEAMS ACROSS *MAGNETIC FIELDS, *ELECTRIC FIELDS.) (MICROWAVE EQUIPMENT, OPTICAL SYSTEMS.) ELECTRON BEAMS, STABILITY, *SPACE CHARGES, *FOCUSING, ELECTRODES, CATHODES (ELECTRON TUBES), *ELECTRON TUBES, MATHEMATICAL ANALYSIS, DIRECT CURRENT, MEASUREMENT.
MICROWAVE LAB., STANFORD U., CALIF.
AD-274 256 62-3-1 DIV. 8

***ELECTRON OPTICS**

(*ELECTRONICS, *TEXTBOOKS, USSR.) (ELECTRON TUBES, AMPLIFIERS, RADIO RECEIVERS, RADIO TRANSMITTERS.) (ELECTRON TUBES, SUPERHIGH FREQUENCY.) ELECTRONS, THEORY, *ELECTRON OPTICS, THERMIONIC EMISSION, PHOTOEMISSION, *CATHODES, OXIDE CATHODES, *DIODES, *TRIODES, TETRODES, PENTODES, *ELECTRON TUBES, FREQUENCY CONVERTERS, *SEMICONDUCTORS, *CATHODE RAY TUBES, KLYSTRONS, MAGNETRONS, TRAVELING WAVE TUBES, *PHOTOTUBES, PHOTOMULTIPLIERS, X RAYS, ELECTRON TUBES.
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, *RIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 063 62-3-1 DIV. 8

***ELECTRON TUBES**

(*ELECTRONICS, *TEXTBOOKS, USSR.) (ELECTRON TUBES, AMPLIFIERS, RADIO RECEIVERS, RADIO TRANSMITTERS.) (ELECTRON TUBES, SUPERHIGH FREQUENCY.) ELECTRONS, THEORY, *ELECTRON OPTICS, THERMIONIC EMISSION, PHOTOEMISSION, *CATHODES, OXIDE CATHODES, *DIODES, *TRIODES, TETRODES, PENTODES, *ELECTRON TUBES, FREQUENCY CONVERTERS, *SEMICONDUCTORS, *CATHODE RAY TUBES, KLYSTRONS, MAGNETRONS, TRAVELING WAVE TUBES, *PHOTOTUBES, PHOTOMULTIPLIERS, X RAYS, ELECTRON TUBES.
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, *RIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 063 62-3-1 DIV. 8

***ELECTRONIC CIRCUITS**

(TEST SETS, TEST EQUIPMENT, TEST METHODS, *TEST FACILITIES, MILITARY EQUIPMENT, *ELECTRONIC EQUIPMENT, INSTRUMENTATION, DESIGN.) (*CIRCUIT TESTERS, PRINTED CIRCUITS, *ELECTRONIC CIRCUITS, TUNED AMPLIFIERS, PREAMPLIFIERS, SIGNAL-TO-NOISE RATIO, TEST EQUIPMENT, TESTS.) (FIELD WIRE COMMUNICATION SYSTEMS, SIDEBANDS, SIGNAL GENERATORS, *PHASE SHIFTERS, BROADBAND, MODULATORS, HALL EFFECT.) ELECTRICAL PROPERTIES, DETERMINATION.
ARMOUR RESEARCH FOUNDATION, CHICAGO, ILL.
AD-274 285 62-3-1 DIV. 30

***ELECTRONIC EQUIPMENT**

(TEST SETS, TEST EQUIPMENT, TEST METHODS, *TEST FACILITIES, MILITARY EQUIPMENT, *ELECTRONIC EQUIPMENT, INSTRUMENTATION, DESIGN.) (*CIRCUIT TESTERS, PRINTED CIRCUITS, *ELECTRONIC CIRCUITS, TUNED AMPLIFIERS, PREAMPLIFIERS, SIGNAL-TO-NOISE RATIO, TEST EQUIPMENT, TESTS.) (FIELD WIRE COMMUNICATION SYSTEMS, SIDEBANDS, SIGNAL GENERATORS, *PHASE SHIFTERS, BROADBAND, MODULATORS, HALL EFFECT.) ELECTRICAL PROPERTIES, DETERMINATION.
ARMOUR RESEARCH FOUNDATION, CHICAGO, ILL.
AD-274 285 62-3-1 DIV. 30

***ELECTRONICS**

(*ELECTRONICS, *TEXTBOOKS, USSR.) (ELECTRON TUBES, AMPLIFIERS, RADIO RECEIVERS, RADIO TRANSMITTERS.) (ELECTRON TUBES, SUPERHIGH FREQUENCY.) ELECTRONS, THEORY, *ELECTRON OPTICS, THERMIONIC EMISSION, PHOTOEMISSION, *CATHODES, OXIDE CATHODES, *DIODES, *TRIODES, TETRODES, PENTODES, *ELECTRON TUBES, FREQUENCY CONVERTERS, *SEMICONDUCTORS, *CATHODE RAY TUBES, KLYSTRONS, MAGNETRONS, TRAVELING WAVE TUBES, *PHOTOTUBES, PHOTOMULTIPLIERS, X RAYS, ELECTRON TUBES.
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 063 62-3-1 DIV. 8

(*NEUTRON SPECTROSCOPY, NEUTRONS, ENERGY, MEASUREMENT, ANALYSIS.) (SEMICONDUCTORS, NEUTRON SPECTROMETERS, SODIUM COMPOUNDS, ISOTOPES, IODINE COMPOUNDS, NEUTRON CAPTURE OF GAMMA RAY SPECTROSCOPY.) (QUARTZ CRYSTALS (SPECTROMETERS), ALPHA SPECTRA, ANALYSIS FOR BORON COMPOUNDS.) (IDENTIFICATION OF IMPURITIES IN *ELECTRONICS, *MATERIALS.) RESEARCH REACTORS.
MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
AD-274 320 62-3-1 DIV. 20

***ELECTRONS**

(DRIFT OF *ELECTRONS AND *PROTONS IN MAGNETIC FIELDS OF EARTH.) (*TERRESTRIAL MAGNETISM, SOLAR FLARES.) (AURORAE, *ELECTRIC FIELDS AND SPACE CHARGES IN ATMOSPHERE.)
RAND CORP., SANTA MONICA, CALIF.
AD-274 182 62-3-1 DIV. 2

(*ELECTRONS, DIFFUSION, CAVITY RESONATORS (MULTIMODE).) (IONIZATION IN MICROWAVES, ELECTRIC FIELDS USING AIR, NITROGEN, HYDROGEN.) INTEGRAL EQUATIONS.
GENERAL TELEPHONE AND ELECTRONICS LABS., INC., PALO ALTO, CALIF.
AD-274 214 62-3-1 DIV. 20

(*ELECTRONS, *SELENIUM COMPOUNDS, FLUORIDES, MEASUREMENT OF IMPACT SHOCK WITH IONS.) (ELECTRON CAPTURE, MOLECULES, VIBRATION, FREQUENCY NEGATIVE ION STUDY.) QUANTUM MECHANICS.
SPACE TECHNOLOGY LABS., INC., LOS ANGELES, CALIF.
AD-274 272 62-3-1 DIV. 25

***ENCYCLOPEDIAS**

(EXPLOSIVES, PROPELLANTS, CHEMICAL PROPERTIES, CHEMICAL REACTIONS, PROCESSING, MANUFACTURING METHODS.) *ENCYCLOPEDIAS FOR *EXPLOSIVES, BIBLIOGRAPHIES, INDEXES.
ORDNANCE TECHNICAL INTELLIGENCE AGENCY, ARLINGTON, VA.
AD-274 026 62-3-1 DIV. 22

***EPOXY RESINS**

(ALLOYS, *ALUMINUM ALLOYS, *MAGNESIUM ALLOYS, *TITANIUM ALLOYS, *STEEL, *STAINLESS STEEL, *NICKEL ALLOYS.) (PLASTICS, *EPOXY RESINS, *EXPANDED PLASTICS, *ACRYLIC RESINS.) (MECHANICAL PROPERTIES, ELECTRICAL PROPERTIES, PHYSICAL PROPERTIES, ELECTRICAL PROPERTIES, DATA, TABLES, INDEXES.)
REPUBLIC AVIATION CORP., FARMINGDALE, N. Y.
AD-274 289 62-3-1 DIV. 17

***EQUATIONS**

(*AERODYNAMIC CONFIGURATIONS, *LAMINAR BOUNDARY LAYER, *COMPRESSIBLE FLOW, SUBSONIC FLOW, SUPERSONIC FLOW, *HYPERSONIC FLOW, VISCOSITY.) (*BOUNDARY LAYER, *EQUATIONS, *NUMERICAL ANALYSIS, *DIFFERENTIAL EQUATIONS, *DIFFERENCE EQUATIONS, *PARTIAL DIFFERENTIAL EQUATIONS.) (SHEETS (FLAT PLATES), SHEAR STRESSES, HEAT TRANSFER, STABILITY, SHOCK WAVES.)
STANFORD U., CALIF.
AD-273 983 62-3-1 DIV. 9

***ERRORS**

(*COMPUTERS, *FEEDBACK, RELIABILITY, *ERRORS, DIGITAL SYSTEMS, PROBABILITY, COMMUNICATION SYSTEMS.) (*COMPUTER LOGIC, METAMATHEMATICS, MEMORY DEVICES, DIGITAL SYSTEMS.)
NEW YORK U., COLL. OF ENGINEERING, N. Y.
AD-274 025 62-3-1 DIV. 5

(*ERRORS, ESTIMATION OF A FINITE DIFFERENCE ANALOGUE OF *GREEN'S FUNCTION FOR ELLIPTIC EQUATIONS, *PARTIAL DIFFERENTIAL EQUATIONS.) (OPERATORS (MATHEMATICS), REAL NUMBERS, *DIFFERENCE EQUATIONS.)
INSTITUTE FOR FLUID DYNAMICS AND APPLIED MATHEMATICS, U. OF MARYLAND, COLLEGE PARK.
AD-274 315 62-3-1 DIV. 15

***ETHANES**

(*ETHANES, *HALOCARBONS, *FLUORIDES, CHLORIDES, BROMIDES, SUBSTITUTES, ISOMER, NUCLEAR MAGNETIC RESONANCE, INFRARED SPECTROSCOPY, MOLECULAR SPECTROSCOPY, CHEMICAL BONDS, THEORY, TEMPERATURE.) ATOMS, FLUORINE, PROTONS, RESONANCE.
NOYES CHEMICAL LAB., U. OF ILLINOIS, URBANA.
AD-274 056 62-3-1 DIV. 4

***ETHANOLS**

(PHYSICAL PROPERTIES OF *ETHANOLS, *MERCURY IN SPHERES, PROPELLANT TANKS DURING *WEIGHTLESSNESS.) (LIQUID ROCKET PROPELLANTS, SURFACE TENSION, SURFACE PROPERTIES, CONFIGURATION, FLUID MECHANICS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 170 62-3-1 DIV. 9

***EXHAUST GASES**

(GUIDED MISSILES, ROCKET MOTORS, *CONDENSATION TRAILS.) (*EXHAUST GASES, DIFFUSION, DYNAMICS.) ANALYSIS.
GEOPHYSICS CORP. OF AMERICA, BEDFORD, MASS.
AD-274 133 62-3-1 DIV. 9

***EXPANDED PLASTICS**

(ALLOYS, *ALUMINUM ALLOYS, *MAGNESIUM ALLOYS, *TITANIUM ALLOYS, *STEEL, *STAINLESS STEEL, *NICKEL ALLOYS.) (PLASTICS, *EPOXY RESINS, *EXPANDED PLASTICS, *ACRYLIC RESINS.) (MECHANICAL PROPERTIES, ELECTRICAL PROPERTIES, PHYSICAL PROPERTIES, ELECTRICAL PROPERTIES, DATA, TABLES, INDEXES.)
REPUBLIC AVIATION CORP., FARMINGDALE, N. Y.
AD-274 289 62-3-1 DIV. 17

***EXPLOSIVE FORMING**

(*METAL FORMING PRESSES, *EXPLOSIVE FORMING, IMPACT SHOCK, RUBBER, SYNTHETIC RUBBER, VELOCITY, PRESSURE, HYDRAULIC PRESSES, PNEUMATIC SYSTEMS.) (SHEETS, ALUMINUM ALLOYS, STAINLESS STEEL, TESTS, DESIGN, DATA.)
GENERAL DYNAMICS/CONVAIR, SAN DIEGO, CALIF.
AD-274 242 62-3-1 DIV. 26

***EXPLOSIVES**

(EXPLOSIVES, PROPELLANTS, CHEMICAL PROPERTIES, CHEMICAL REACTIONS, PROCESSING, MANUFACTURING METHODS.) *ENCYCLOPEDIAS FOR *EXPLOSIVES, BIBLIOGRAPHIES, INDEXES.
ORDNANCE TECHNICAL INTELLIGENCE AGENCY, ARLINGTON, VA.
AD-274 026 62-3-1 DIV. 22

***EXTREMELY LOW FREQUENCY**

(*ATMOSPHERICS; *EXTREMELY LOW FREQUENCY; MEASUREMENT; INSTRUMENTATION;) (MAGNETIC RECORDING SYSTEMS; AUDIOFREQUENCY OSCILLATORS; PULSE GENERATORS; ROTARY SWITCHES; LOOP ANTENNAS; LOW PASS FILTERS;) NEW MEXICO. NEW MEXICO U., ENGINEERING EXPERIMENT STATION, ALBUQUERQUE.
AD-274 017 62-3-1 DIV. 4

(*ATMOSPHERICS; *EXTREMELY LOW FREQUENCY; MEASUREMENT;) EARTH-IONOSPHERE CAVITY MODE FREQUENCIES.
NEW MEXICO U., ENGINEERING EXPERIMENT STATION, ALBUQUERQUE.
AD-274 018 62-3-1 DIV. 4

***EXTRUSION**

(METALS; *ALUMINUM; *TITANIUM ALLOYS; *ALUMINUM ALLOYS; VANADIUM ALLOYS; *STEEL; STAINLESS STEEL; MACHINING; *EXTRUSION; EXPLOSIVE FORMING; MANUFACTURING METHODS; FEASIBILITY STUDIES;) (TOOLS; MACHINE TOOLS; DIES; DESIGN; INSTRUMENTATION;) AIRFRAMES; AIRCRAFT; GUIDED MISSILES; SPACESHIPS; ALLOYS.
*WESTINGHOUSE ELECTRIC CORP., BLAIRSVILLE, PA.
AD-274 281 62-3-1 DIV. 26

(HYDROSTATIC PRESSURE; *EXTRUSION; *STEEL; *TITANIUM ALLOYS; ALUMINUM ALLOYS; VANADIUM ALLOYS;) (*MACHINE TOOLS; HYDRAULIC PRESSES; DESIGN;) (HIGH PRESSURE RESEARCH; *DIES; HYDRAULIC FLUIDS; HYDRAULIC SEALS; METAL SEALS; RUBBER SEALS;) (STRESSES; MATHEMATICAL ANALYSIS; SHEAR STRESSES;)
BATTELLE MEMORIAL INST., COLUMBUS.
AD-274 372 62-3-1 DIV. 26

***FAILURE (MECHANICS)**

(*BIBLIOGRAPHY; *THERMOELECTRICITY; GENERATORS; MATERIALS; RADIATION EFFECTS; RELIABILITY; *FAILURE (MECHANICS); AGING;) (*RADIOACTIVE BATTERIES; NUCLEAR POWER PLANTS; NUCLEAR ENERGY; SELENIUM; TELLURIUM; REACTOR FUELS; TELLURIUM COMPOUNDS.)
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
AD-273 953 62-3-1 DIV. 7

***FALLING BODIES**

(*FALLING BODIES; *SPHERES; MEASUREMENT OF ATMOSPHERE, DENSITY BY *RADAR TRACKING;) *ATMOSPHERIC SOUNDING.
AIR FORCE CAMBRIDGE RESEARCH LABS., BEDFORD, MASS.
AD-274 213 62-3-1 DIV. 2

***FEED MECHANISMS**

(*AUTOMATIC WEAPONS; *SMALL ARMS; *FEED MECHANISMS; EFFECTIVENESS; TESTS;) (SMALL ARMS AMMUNITION; PACKAGING; CONTAINERS;)
ARMY INFANTRY BOARD, FORT BENNING, GA.
AD-274 367 62-3-1 DIV. 22

***FEEDBACK**

(*COMPUTERS; *FEEDBACK; RELIABILITY; *ERRORS; DIGITAL SYSTEMS; PROBABILITY; COMMUNICATION SYSTEMS;) (*COMPUTER LOGIC; METAMATHEMATICS; MEMORY DEVICES; DIGITAL SYSTEMS;)
NEW YORK U., COLL. OF ENGINEERING, N. Y.
AD-274 025 62-3-1 DIV. 9

*CONTROL SYSTEMS; *FEEDBACK; SIGNALS; DAMPING; DIFFERENTIAL EQUATIONS.
PURDUE U., LAFAYETTE, IND.
AD-274 123 62-3-1 DIV. 12

(SYNTHESIS OF *LINEAR SYSTEMS (NONSTATIONARY) *FEEDBACK (SYSTEMS);) (*CONTROL SYSTEMS; POLYNOMIALS; FUNCTIONS; TIME; DIFFERENTIAL EQUATIONS; PARTIAL DIFFERENTIAL EQUATIONS;)
CALIFORNIA U., LOS ANGELES.
AD-274 230 62-3-1 DIV. 8

(SYNTHESIS OF *LINEAR SYSTEMS (NONSTATIONARY); *FEEDBACK SYSTEMS;) (*CONTROL SYSTEMS; ALGEBRA; *DIFFERENTIAL EQUATIONS; TIME; FUNCTIONS; POLYNOMIALS; TRANSFORMATIONS (MATHEMATICS); OPERATORS (MATHEMATICS);)
CALIFORNIA U., LOS ANGELES.
AD-274 231 62-3-1 DIV. 8

***FERRITES**

(*MAGNETIC MATERIALS; BARIUM COMPOUNDS; COBALT COMPOUNDS; IRON COMPOUNDS; NICKEL COMPOUNDS; OXIDES; CRYSTALS FOR MICROWAVE FREQUENCY; *PHASE SHIFTERS; *MICROWAVE NETWORKS; ELECTRONIC CIRCUITS; TEST METHODS; X-RAY DIFFRACTION ANALYSIS; TESTS; MEASUREMENT; SYNTHESIS;) (SUPERHIGH FREQUENCY; EXTREMELY HIGH FREQUENCY; K BAND; RESONANCE; ABSORPTION; MICROWAVE EQUIPMENT;) (*FERRITES; FERROMAGNETIC MATERIALS; *METALLIC CRYSTALS;) *BIBLIOGRAPHY, THEORY.
SPERRY MICROWAVE ELECTRONICS CO., CLEARWATER, FLA.
AD-273 984 62-3-1 DIV. 8

***FERROELECTRIC CRYSTALS**

(*FERROELECTRIC MATERIALS; *FERROELECTRIC CRYSTALS; *STRONTIUM COMPOUNDS; *BARIUM COMPOUNDS; *TITANATES; IMPURITIES OF RARE EARTH ELEMENTS SUCH AS GADOLINIUM; IONS; MICROWAVE SPECTROSCOPY; PARAMAGNETIC RESONANCE; NUCLEAR SPINS; TEMPERATURE; PHASE TRANSITIONS; SPECTROGRAPHIC ANALYSIS; REFRACTIVE PROPERTIES;)
RAYTHEON CO., WALTHAM, MASS.
AD-273 981 62-3-1 DIV. 25

***FERROELECTRIC MATERIALS**

(*FERROELECTRIC MATERIALS; *FERROELECTRIC CRYSTALS; *STRONTIUM COMPOUNDS; *BARIUM COMPOUNDS; *TITANATES; IMPURITIES OF RARE EARTH ELEMENTS SUCH AS GADOLINIUM; IONS; MICROWAVE SPECTROSCOPY; PARAMAGNETIC RESONANCE; NUCLEAR SPINS; TEMPERATURE; PHASE TRANSITIONS; SPECTROGRAPHIC ANALYSIS; REFRACTIVE PROPERTIES;)
RAYTHEON CO., WALTHAM, MASS.

AD-273 981 62-3-1 DIV. 25

***FERROMAGNETISM**

(*FERROMAGNETISM; *ANTIFERROMAGNETISM; LATTICES; NUCLEAR SPINS;)
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-273 950 62-3-1 DIV. 20

***FIBERS**

(*REINFORCING MATERIALS; *GLASS TEXTILES; *CERAMIC FIBERS; *METALLIC TEXTILES; *FIBERS; WIRE; SINGLE CRYSTALS; METALS; CERAMIC MATERIALS; GRAPHITE; PRODUCTION; DRAWING (MACHINE PROCESSING); EXTRUSION; CASTING; GROWTH; MECHANICAL PROPERTIES; PHYSICAL PROPERTIES; BIBLIOGRAPHY.
CLEVITE CORP., CLEVELAND, OHIO.
AD-274 379 62-3-1 DIV. 14

***FILAMENT WOUND CONSTRUCTION**

(*ROCKET CASES; *FILAMENT WOUND CONSTRUCTION; MATERIALS; FIBERS; *SYNTHETIC FIBERS; FILAMENTS; GLASS TEXTILES; IMPREGNATION; COATINGS; RESINS; HEAT RESISTANT POLYMERS;) HYDROSTATIC PRESSURE; HIGH PRESSURE RESEARCH; HIGH TEMPERATURE RESEARCH; TENSILE PROPERTIES; FAILURE (MECHANICS); TESTS.
AEROJET-GENERAL CORP., AZUSA, CALIF.
AD-273 991 62-3-1 DIV. 27

(*ROCKET CASES; *SANDWICH CONSTRUCTION; *FILAMENT WOUND CONSTRUCTION; HONEYCOMB CORES; GLASS TEXTILES; DESIGN; MODEL TESTS; STRESSES; MATHEMATICAL ANALYSIS; LAMINATES; RESINS; REINFORCING MATERIALS; NYLON; PLASTICS;) (MONOCOQUES; BERYLLIUM; STEEL; TITANIUM;) (TEST METHODS; CYLINDRICAL BODIES; STRESSES; FAILURE (MECHANICS); LOAD DISTRIBUTION;) EXPANDED PLASTICS; ADHESIVES; BONDING.
NORTH AMERICAN AVIATION, INC., DOWNEY, CALIF.
AD-274 069 62-3-1 DIV. 27

(*PRESSURE VESSELS; *ROCKET CASES; *FILAMENT WOUND CONSTRUCTION; GLASS TEXTILES; RESINS; REINFORCING MATERIALS; PACKAGING; WIRE WINDING MACHINES; MANUFACTURING METHODS; STRUCTURES; DESIGN; STRESSES; FAILURE (MECHANICS); HYDROSTATIC PRESSURE; TEST METHODS;)
BENDIX PRODUCTS DIV., BENDIX CORP., SOUTH BEND, IND.
AD-274 091 62-3-1 DIV. 27

***FLAME PROPAGATION**

(*FLAMES; INHIBITION;) (*FLAME PROPAGATION; FUEL ADDITIVES; METHANES; OXYGEN; HYDROGEN COMPOUNDS; BROMIDES; FREE RADICALS; ATOMS; HALOGENS;) (THERMAL DIFFUSION; REACTION KINETICS; THERMODYNAMICS; MICROSTRUCTURE; TRANSPORT PROPERTIES;) (ETHYLENES; FLUORIDES; POLYMERS; GLASS; CERAMIC MATERIALS;)
APPLIED PHYSICS LAB., JOHNS HOPKINS U., SILVER SPRING, MD.
AD-274 397 62-3-1 DIV. 10

***FLAMES**

(*FLAMES; COMBUSTION; GASES; AIR; HYDROCARBONS; *CYANO RADICALS; SPECTROGRAPHIC ANALYSIS; MOLECULAR SPECTROSCOPY; EXCITATION; ATOMIC ENERGY LEVELS; QUANTUM MECHANICS; ELECTRON TRANSITIONS;) SHOCK WAVES; SOLAR ATMOSPHERE; STARS.
INSTITUTE FOR MOLECULAR PHYSICS, U. OF MARYLAND, COLLEGE PARK.
AD-274 073 62-3-1 DIV. 25

(*FLAMES; INHIBITION;) (*FLAME PROPAGATION; FUEL ADDITIVES; METHANES; OXYGEN; HYDROGEN COMPOUNDS; BROMIDES; FREE RADICALS; ATOMS; HALOGENS;) (THERMAL DIFFUSION; REACTION KINETICS; THERMODYNAMICS; MICROSTRUCTURE; TRANSPORT PROPERTIES;) (ETHYLENES; FLUORIDES; POLYMERS; GLASS; CERAMIC MATERIALS;)
APPLIED PHYSICS LAB., JOHNS HOPKINS U., SILVER SPRING, MD.
AD-274 397 62-3-1 DIV. 10

***FLIGHT SIMULATORS**

(*DIGITAL COMPUTERS; *FLIGHT SIMULATORS; *TRAINING DEVICES; STANDARDIZATION OF SIMULATION; AIRCRAFT; FLAPS; PNEUMATIC SYSTEMS; HYDRAULIC SYSTEMS; TURBOJET ENGINES; FUEL SYSTEMS; LANDING GEAR; ELECTRICAL EQUIPMENT OF JET PLANES; JET BOMBERS; ATTACK BOMBERS; JET FIGHTERS; PATROL PLANES;) (AUTOMATIC PROGRAMMING; MATHEMATICAL LOGIC;)
GOODYEAR AIRCRAFT CORP., AKRON, OHIO.
AD-274 175 62-3-1 DIV. 30

***FLUID FLOW**

(*MAGNETOHYDRODYNAMICS; *FLUID FLOW (TWO DIMENSIONAL) IN *MAGNETIC FIELDS;) (VECTOR ANALYSIS; PERTURBATION THEORY; SUBSONIC FLOW; SUPERSONIC FLOW; COMPRESSIBLE FLOW;) NUMERICAL ANALYSIS.
AVCO EVERETT RESEARCH LAB., MASS.
AD-274 287 62-3-1 DIV. 25

(*MAGNETOHYDRODYNAMICS; *FLUID FLOW;) (MAGNETIC FIELDS; VECTOR ANALYSIS; INCOMPRESSIBLE FLOW OR *SUPERSONIC FLOW IN SHOCK TUBES;) (*PERTURBATION THEORY; PARTIAL DIFFERENTIAL EQUATIONS.
AVCO EVERETT RESEARCH LAB., MASS.
AD-274 288 62-3-1 DIV. 25

(*CRYOGENICS; PUMPS; *FLUID MECHANICS; FLUIDS; LIQUEFIED GASES; *FLUID FLOW; THEORY; TESTS;) (MOLECULES; SURFACE PROPERTIES; PRESSURE;) (*WIND TUNNELS, VACUUM SYSTEMS; SUPERAERODYNAMICS;) SURFACES; GEOMETRY.
ARNOLD ENGINEERING DEVELOPMENT CENTER, ARNOLD AIR FORCE STATION, TENN.
AD-274 355 62-3-1 DIV. 9

***FLUID MECHANICS**

(*CRYOGENICS; PUMPS; *FLUID MECHANICS; FLUIDS; LIQUEFIED GASES; *FLUID FLOW; THEORY; TESTS;) (MOLECULES; SURFACE PROPERTIES; PRESSURE;) (*WIND TUNNELS, VACUUM SYSTEMS; SUPERAERODYNAMICS;) SURFACES; GEOMETRY.
ARNOLD ENGINEERING DEVELOPMENT CENTER, ARNOLD AIR FORCE STATION, TENN.
AD-274 355 62-3-1 DIV. 9

***FLUORIDES**

(*ETHANES; *HALOCARBONS; *FLUORIDES; CHLORIDES; BROMIDES; SUBSTITUTES; ISOMERS; NUCLEAR MAGNETIC RESONANCE; INFRARED SPECTROSCOPY; MOLECULAR SPECTROSCOPY; CHEMICAL BONDS; THEORY; TEMPERATURE;) ATOMS; FLUORINE; PROTONS; RESONANCE.
NOYES CHEMICAL LAB., U. OF ILLINOIS, URBANA.
AD-274 056 62-3-1 DIV. 9

*FLUORIDES; *BORON COMPOUNDS; *OXIDES; LABELED SUBSTANCES; BORON; ISOTOPES; SYNTHESIS; CHEMICAL REACTIONS; DISPROPORTIONATION; DECOMPOSITION; THERMOCHEMISTRY; HEAT OF REACTION; HEAT OF FORMATION; ENTROPY; REACTION KINETICS; INFRARED SPECTROSCOPY; LOW TEMPERATURE RESEARCH; HIGH TEMPERATURE RESEARCH.
HUGHES TOOL CO., CULVER CITY, CALIF.
AD-274 243 62-3-1 DIV. 6

***FLUXMETERS**

(*TERRESTRIAL MAGNETISM, MEASUREMENT;) (*FLUXMETERS; MAGNETIC AMPLIFIERS; AUDIOFREQUENCY; AUDIOFREQUENCY OSCILLATORS; TIMING CIRCUITS; CALIBRATION; ELECTRONIC CIRCUITS; DETECTORS;) (TERRESTRIAL MAGNETISM; METEORS;)
DENVER RESEARCH INST., COLO.
AD-274 380 62-3-1 DIV. 2

***FLYING PLATFORMS**

(*FLYING PLATFORMS; GROUND EFFECT; DESIGN;) (INDUCTION SYSTEMS; DUCT INLETS; *SHROUDED PROPELLERS; DUCTED FANS; *DUCTS; CONFIGURATION; AERODYNAMICS;) (NOZZLES; GAS FLOW; JETS; VELOCITY; THRUST; PRESSURE; EFFECTIVENESS; MATHEMATICAL ANALYSIS;)
KELLETT AIRCRAFT CORP., PHILADELPHIA, PA.
AD-274 159 62-3-1 DIV. 1

(*FLYING PLATFORMS WITH AERIAL PROPELLERS;) (MODEL TESTS OF CONTROL SYSTEMS; STABILITY (LATERAL); STABILITY (LONGITUDINAL); PITCH; ROLL; AERODYNAMIC DATA; MODEL TESTS;)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 327 62-3-1 DIV. 9

(*FLYING PLATFORMS; GROUND EFFECT; POWER; REDUCTION; MILITARY REQUIREMENTS; MATHEMATICAL ANALYSIS;) (JETS; FLAPS; LIFT; DRAG; AERODYNAMICS;)
AERONUTRONIC, NEWPORT BEACH, CALIF.
AD-274 363 62-3-1 DIV. 1

(*FLYING PLATFORMS; GROUND EFFECTS; AERODYNAMIC CONFIGURATIONS; LOAD DISTRIBUTION; MOTION; PITCH; ROLL; ACCELERATION; FLIGHT TESTING OVER WATER;)
GENERAL DYNAMICS/CONVAIR, SAN DIEGO, CALIF.
AD-274 394 62-3-1 DIV. 1

***FOCUSING**

(*ELECTRON GUNS; THEORY; DESIGN; TESTS WITH *ELECTRON BEAMS ACROSS *MAGNETIC FIELDS; *ELECTRIC FIELDS.) (MICROWAVE EQUIPMENT; OPTICAL SYSTEMS.) ELECTRON BEAMS; STABILITY; *SPACE CHARGES; *FOCUSING; ELECTRODES; CATHODES (ELECTRON TUBES); *ELECTRON TUBES; MATHEMATICAL ANALYSIS; DIRECT CURRENT; MEASUREMENT.
MICROWAVE LAB., STANFORD U., CALIF.
AD-274 256 62-3-1 DIV. 8

***FORGING**

(HIGH TEMPERATURE RESEARCH; *FORGING; *DIES FOR REFRACTORY MATERIALS; METALS; CERAMIC MATERIALS; CERMETS; INTERMETALLIC COMPOUNDS; DESIGN.) (MATERIALS; HEAT RESISTANT ALLOYS; TITANIUM COMPOUNDS; BORIDES; SILICON COMPOUNDS; CARBIDES; TANTALUM COMPOUNDS; BERYLLIUM COMPOUNDS; ALUMINUM COMPOUNDS; OXIDES; GRAPHITE; OXIDATION; MECHANICAL PROPERTIES; STRESSES; GRAPHITE COMPOUNDS; SILICON.) ALLOYS; MOLYBDENUM ALLOYS; TUNGSTEN ALLOYS; NIOBIUM ALLOYS; NICKEL ALLOYS; CHROMIUM ALLOYS.
ARMOUR RESEARCH FOUNDATION, CHICAGO, ILL.
AD-274 199 62-3-1 DIV. 26

***FREE RADICALS**

(ORGANIC COMPOUNDS; ALKYL RADICALS; *SULFIDES; *THIOLS; PHOTOLYSIS; *DISSOCIATION; CHEMICAL BONDS; ENERGY; REACTION KINETICS; CHEMICAL REACTIONS; *RECOMBINATION REACTIONS; DISPROPORTIONATION; THERMOCHEMISTRY; *FREE RADICALS.) PHOTOCHEMICAL REACTIONS; SPECTROGRAPHIC ANALYSIS; LOW TEMPERATURE RESEARCH.
LUND U. (SWEDEN).
AD-274 252 62-3-1 DIV. 4

***FREQUENCY ANALYZERS**

(PITCH; ROLL; DAMPING; *FREQUENCY ANALYZERS; TABLES.) (OSCILLATION OF *SHIP HULLS.) (HARMONIC ANALYSIS; INTEGRAL EQUATIONS.)
CARNEGIE INST. OF TECH., PITTSBURGH, PA.
AD-274 104 62-3-1 DIV. 25

(*DOPPLER RADAR; RADAR PULSES; RADAR REFLECTIONS; RANGE FINDING; DISPLAY SYSTEMS; *DATA PROCESSING SYSTEMS; RADAR EQUIPMENT; ELECTRONIC CIRCUITS; DESIGN.) (RADAR SIGNALS; *VIDEO SIGNALS; *FREQUENCY ANALYZERS; SWEEP GENERATORS; STORAGE TUBES; MODULATORS; OPTICAL SYSTEMS; TIMING CIRCUITS; *ULTRASONICS; IMAGE CONVERTER TUBES; TESTS.) (RADAR RECEIVERS; RADAR RANGE COMPUTERS.)
APPLIED PHYSICS LAB., JOHNS HOPKINS U., SILVER SPRING, MD.
AD-274 136 62-3-1 DIV. 6

***FREQUENCY MULTIPLIERS**

(*SEMICONDUCTORS; *PARAMETRIC AMPLIFIERS; *MICROWAVE AMPLIFIERS; *DIODES; DESIGN FOR HELIXES; PARAMETRIC AMPLIFIERS; DISTRIBUTED AMPLIFIERS WITH COAXIAL CABLES; MICROWAVE OSCILLATORS; EXTREMELY HIGH FREQUENCY; *FREQUENCY MULTIPLIERS.) (AMPLIFIERS; GERMANIUM; GALLIUM COMPOUNDS; ANTIMONIDES; DESIGN; THEORY; NOISE (RADIO); NOISE (RADAR).) (AMPLIFIERS WITH NEGATIVE RESISTANCE CIRCUITS; TRANSMISSION LINES; HALL EFFECT; SOLID STATE PHYSICS.) (*FREQUENCY SHIFT CONVERTERS; ULTRA HIGH FREQUENCY; S BAND; ELECTRONIC CIRCUITS; *MICROWAVE EQUIPMENT; NONLINEAR SYSTEMS; PUMPS; THEORY; MATHEMATICAL ANALYSIS.)
DAVID SARNOFF RESEARCH CENTER, PRINCETON, N. J.
AD-274 340 62-3-1 DIV. 8

***FREQUENCY SHIFT CONVERTERS**

(*SEMICONDUCTORS; *PARAMETRIC AMPLIFIERS; *MICROWAVE AMPLIFIERS; *DIODES; DESIGN FOR HELIXES; PARAMETRIC AMPLIFIERS; DISTRIBUTED AMPLIFIERS WITH COAXIAL CABLES; MICROWAVE OSCILLATORS; EXTREMELY HIGH FREQUENCY; *FREQUENCY MULTIPLIERS.) (AMPLIFIERS; GERMANIUM; GALLIUM COMPOUNDS; ANTIMONIDES; DESIGN; THEORY; NOISE (RADIO); NOISE (RADAR).) (AMPLIFIERS WITH NEGATIVE RESISTANCE CIRCUITS; TRANSMISSION LINES; HALL EFFECT; SOLID STATE PHYSICS.) (*FREQUENCY SHIFT CONVERTERS; ULTRA HIGH FREQUENCY; S BAND; ELECTRONIC CIRCUITS; *MICROWAVE EQUIPMENT; NONLINEAR SYSTEMS; PUMPS; THEORY; MATHEMATICAL ANALYSIS.)
DAVID SARNOFF RESEARCH CENTER, PRINCETON, N. J.
AD-274 340 62-3-1 DIV. 8

***FUEL CELLS**

(*FUEL CELLS;, *ELECTROLYTIC CELLS; FUELS; HYDROCARBONS; ELECTRODES; *OXYGEN ELECTRODES; HYDROGEN ELECTRODES; ION EXCHANGE; MEMBRANES; *CATALYSTS; PLATINUM; CHEMICAL REACTIONS; OXIDATION-REDUCTION REACTIONS; ELECTROCHEMISTRY; POLARIZATION; THERMODYNAMICS.) HYDROGEN; OXYGEN; LOW TEMPERATURE RESEARCH.
GENERAL ELECTRIC CO., LYNN, MASS.
AD-273 971 62-3-1 DIV. 7

***FUEL NOZZLES**

(EFFECTIVENESS OF *FUEL NOZZLES WHEN USING CONTAMINATED JET ENGINE FUELS.) (*TURBOJET ENGINES; FUEL SYSTEMS; FUEL FILTERS; FUEL INJECTORS; *TURBOJET FUEL NOZZLES.) (FUEL INJECTION; FUEL SPRAYS; DISTORTION BY IMPURITIES IN FUELS AND EFFECT ON COMBUSTION.)
FUNGI.
PRATT AND WHITNEY AIRCRAFT, *EAST PALM BEACH, FLA.
AD-274 335 62-3-1 DIV. 27

***GALLIUM COMPOUNDS**

(*DIODES; INTERMETALLIC COMPOUNDS; *GALLIUM COMPOUNDS; *ARSENIDES; *PHOSPHIDES; *NOISE (RADIO); MEASUREMENT.) (CRYSTALS; GROWTH; METALLIC COMPOUNDS; VAPORS; TRANSPORT PROPERTIES; CHEMICAL IMPURITIES; LOW TEMPERATURE RESEARCH.) (ELECTRIC INSULATION; CONDUCTIVITY; SPACE CHARGES; TESTS.) (GOLD ALLOYS; ANTIMONY ALLOYS; GERMANIUM ALLOYS; TIN ALLOYS; SILVER ALLOYS; TELLURIUM ALLOYS.)
GENERAL ELECTRIC CO., SYRACUSE, N. Y.
AD-274 300 62-3-1 DIV. 8

(*DIODES; *SEMICONDUCTORS; HIGH TEMPERATURE RESEARCH; CRYSTALS; GROWTH; ELECTRONS; DIFFUSION; SOLUBILITY; MEASUREMENT; ELECTROPLATING; GAMMA RAYS.) (*GALLIUM COMPOUNDS; ARSENIDES; COPPER; GERMANIUM; SILICON; POTASSIUM; ALUMINUM.)
GENERAL ELECTRIC CO., SYRACUSE, N. Y.
AD-274 391 62-3-1 DIV. 8

***GAS BEARINGS**

(*GAS BEARINGS; COMPRESSIBLE FLOW; VISCOSITY; FLUID FLOW.) (PARTIAL DIFFERENTIAL EQUATIONS; PERTURBATION THEORY.) (*JOURNAL BEARINGS; BEARINGS; *LUBRICATION.)
MECHANICAL TECHNOLOGY INC., LATHAM, N. Y.
AD-273 934 62-3-1 DIV. 9

***GAS DIFFUSION**

(MIXTURES; *GASES; *TRANSPORT PROPERTIES; VISCOSITY; *GAS DIFFUSION; *THERMAL DIFFUSION; DIFFUSION; HEAT TRANSFER; THEORY; THERMODYNAMICS.) (NEON AND AMMONIA; ARGON AND HYDROGEN COMPOUNDS; CHLORIDES; HYDROGEN AND WATER; SULFUR COMPOUNDS; DIOXIDES; ETHYL RADICALS; CHLORIDES.) ISOTOPES.
APPLIED PHYSICS LAB., JOHNS HOPKINS U., SILVER SPRING, MD.
AD-274 137 62-3-1 DIV. 25

***GAS IONIZATION**

(*QUANTUM MECHANICS; IONS AND *GAS IONIZATION IN *ELECTROMAGNETIC FIELDS.) (TRANSPORT PROPERTIES; RELAXATION TIME; *QUANTUM STATISTICS; IRREVERSIBLE PROCESSES; TENSOR ANALYSIS; MAGNETIC FIELDS.)
OSLO U. (NORWAY).
AD-274 099 62-3-1 DIV. 25

(PLASMA PHYSICS; *GAS IONIZATION; *MAGNETIC PINCH; ELECTROMAGNETIC FIELDS.) (SHOCK TUBES; ARGON; HYDROGEN; *PLASMA PHYSICS.) (ELECTROMAGNETIC FIELDS; LOW FREQUENCY.) SCHLIEREN PHOTOGRAPHY.
MAGNETOGASDYNAMICS LAB., MASS. INST. OF TECH., CAMBRIDGE.
AD-274 165 62-3-1 DIV. 25

(*GAS IONIZATION; PLASMA PHYSICS; *MAGNETIC PINCH; IONS; *DIFFUSION; MAGNETIC FIELDS.) FLUID MECHANICS.
MAGNETOGASDYNAMICS LAB., MASS. INST. OF TECH., CAMBRIDGE.
AD-274 166 62-3-1 DIV. 25

***GASES**

(MIXTURES; *GASES; *TRANSPORT PROPERTIES; VISCOSITY; *GAS DIFFUSION; *THERMAL DIFFUSION; DIFFUSION; HEAT TRANSFER; THEORY; THERMODYNAMICS.) (NEON AND AMMONIA; ARGON AND HYDROGEN COMPOUNDS; CHLORIDES; HYDROGEN AND WATER; SULFUR COMPOUNDS; DIOXIDES; ETHYL RADICALS; CHLORIDES.) ISOTOPES.
APPLIED PHYSICS LAB., JOHNS HOPKINS U., SILVER SPRING, MD.
AD-274 137 62-3-1 DIV. 25

(*GASES; DISSOCIATION.) (*LOW TEMPERATURE RESEARCH; MOLECULES; ENTROPY; SPECIFIC HEAT.) (*THERMODYNAMICS; ANALYSIS.) DIFFERENTIAL EQUATIONS.
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 222 62-3-1 DIV. 9

***GEARS**

(*GEARS; LUBRICATION; HIGH PRESSURE RESEARCH; HIGH TEMPERATURE RESEARCH; FAILURE (MECHANICS); HARDNESS,) (*LUBRICANTS; *MINERAL OILS; *HYDRAULIC GEAR FLUIDS; OILS; SILICONES; SILICATES; ESTERS; LUBRICANT ADDITIVES; PHOSPHORUS COMPOUNDS; FILMS; VISCOSITY; LOADING.)
SHELL DEVELOPMENT CO., EMERYVILLE, CALIF.
AD-273 985 62-3-1 DIV. 26

***GENERATORS**

(SOLID STATE PHYSICS; *SOLAR CELLS; *GENERATORS; DESIGN.) (*PHOTOELECTRIC CELLS; METALS AND *SEMICONDUCTORS; CADMIUM COMPOUNDS; SULFIDES; *PHOTOCONDUCTIVITY; *ELECTRIC POWER PRODUCTION.)
GIANNINI CONTROLS CORP., PASADENA, CALIF.
AD-273 974 62-3-1 DIV. 7

(*GENERATORS, AUXILIARY POWER PLANTS; *THERMOELECTRICITY; *ISOTOPES; HEAT TRANSFER; HEAT EXCHANGERS; COOLING; MANUFACTURING METHODS.) (POWER PLANTS; POWER SUPPLIES; *ELECTRIC POWER PRODUCTION; *NUCLEAR POWER PLANTS; THERMAL CONDUCTIVITY; THERMOCOUPLES; IMPEDANCE MATCHING; TESTS.)
WESTINGHOUSE ELECTRIC CORP., CHESWICK, PA.
AD-274 280 62-3-1 DIV. 7

***GEOGRAPHY**

(AERIAL PHOTOGRAPHS; MAPS; ANALYSIS; *GEOGRAPHY.)
BOWLING GREEN STATE U., OHIO.
AD-274 361 62-3-1 DIV. 2

***GEOPHYSICS**

(*SYMPOSIA; *GEOPHYSICS.) (MEASUREMENT OF PHYSICAL PROPERTIES WITH RESPECT TO EARTH BY SPECTROGRAPHIC ANALYSIS OF ELECTROMAGNETIC WAVES.)
INSTITUTE OF SCIENCE AND TECH., U. OF MICHIGAN, ANN ARBOR.
AD-274 155 62-3-1 DIV. 2

***GERMANIUM COMPOUNDS**

(*METALORGANIC COMPOUNDS; CARBON COMPOUNDS; *SILICON COMPOUNDS; *GERMANIUM COMPOUNDS; *TIN COMPOUNDS; *LEAD COMPOUNDS; PHENYL RADICALS; BENZENES; *LUMINESCENT MATERIALS; PHOSPHORESCENT MATERIALS; *LUMINESCENCE; PHOSPHORESCENCE; FLUORESCENCE; SPECTROGRAPHIC ANALYSIS; ULTRAVIOLET SPECTROSCOPY; ABSORPTION; ULTRAVIOLET RADIATION; EXCITATION; HALF LIFE; PHOSPHORESENT DECAY.) (THEORY; QUANTUM MECHANICS; ELECTRON TRANSITIONS.)
AERONAUTICAL RESEARCH LAB., OFFICE OF AEROSPACE RESEARCH, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 295 62-3-1 DIV. 25

***GLASS**

(MIXTURES; *HYDROCARBONS; *GLASS; *LOW TEMPERATURE RESEARCH; FREEZING; PHYSICAL PROPERTIES; VISCOSITY; MELTING.) (PENTANES; HEXANES; CYCLOHEXANES.) (ALKYL RADICALS; *SULFIDES; *THIOLS; *IODINE; ETHYL RADICALS; HYDROGEN COMPOUNDS; *IODIDES; ORGANIC SOLVENTS; HYDROCARBONS; *PHOTOLYSIS; PHOTOCHEMICAL REACTIONS.)
LUND U. (SWEDEN).
AD-274 160 62-3-1 DIV. 4

(*LAMINATES; *REINFORCING MATERIALS; *GLASS; GLASS TEXTILES; *MICA; DISKS; FILMS; PLASTICS; STRUCTURES; MATERIALS.) (PROCESSING; FILAMENT WOUND CONSTRUCTION; CASTING; MOLDING; HYDROSTATIC PRESSURE.) (TESTS; STRESSES; DEFORMATION; MECHANICAL PROPERTIES; ELECTRICAL PROPERTIES; TENSILE PROPERTIES.) (BEAMS; CYLINDRICAL BODIES; ROCKET MOTOR NOZZLES; CONTAINERS; SCREW THREADS; BATTERY COMPARTMENTS.)
NARMCO INDUSTRIES, INC., SAN DIEGO, CALIF.
AD-274 332 62-3-1 DIV. 14

(*GLASS TEXTILES; FIBERS; MANUFACTURING METHODS; DRAWING (MACHINE PROCESSING); INDUSTRIAL EQUIPMENT; TENSILE PROPERTIES; PROCESSING; THEORY; VISCOSITY; TEMPERATURE; CONFIGURATION.) (METAL COATINGS OF ALUMINUM ALLOYS AND SILICON ALLOYS OR LEAD ALLOYS AND INDIUM ALLOYS ON GLASS; TESTS.)
ARMOUR RESEARCH FOUNDATION, CHICAGO, ILL.
AD-274 296 62-3-1 DIV. 14

(*REINFORCING MATERIALS; *GLASS TEXTILES; *CERAMIC FIBERS; *METALLIC TEXTILES; *FIBERS; WIRE; SINGLE CRYSTALS; METALS; CERAMIC MATERIALS; GRAPHITE; PRODUCTION; DRAWING (MACHINE PROCESSING); EXTRUSION; CASTING; GROWTH; MECHANICAL PROPERTIES; PHYSICAL PROPERTIES; BIBLIOGRAPHY.
CLEVITE CORP., CLEVELAND, OHIO.
AD-274 379 62-3-1 DIV. 14

***GRAINS (METALLURGY)**

(*METALS; ZONE MELTING; *GRAINS (METALLURGY); GROWTH; CRYSTAL STRUCTURE; CRYSTALLIZATION; THEORY; MATHEMATICAL ANALYSIS; EQUATIONS.)
ILLINOIS INST. OF TECH., CHICAGO.
AD-273 979 62-3-1 DIV. 17

***GRAPHITE**

(*CERAMIC MATERIALS; *GRAPHITE; THERMAL RADIATION; BLACKBODY RADIATION; ABSORPTION; HEAT TRANSFER FROM SURFACES.) (*CARBIDES OF SILICON COMPOUNDS; TANTALUM COMPOUNDS; TUNGSTEN COMPOUNDS; ZIRCONIUM COMPOUNDS; NICKEL ALLOYED WITH TITANIUM COMPOUNDS.) (*NITRIDES OF BORON COMPOUNDS.) (*OXIDES OF ALUMINUM COMPOUNDS; BERYLLIUM COMPOUNDS; MAGNESIUM COMPOUNDS; ZIRCONIUM COMPOUNDS.) (*SILICIDES OF MOLYBDENUM COMPOUNDS.) DATA; TABLES.
DEFENSE METALS INFORMATION CENTER; COLUMBUS; OHIO.
AD-274 148 62-3-1 DIV. 14

(*GRAPHITE; SHEETS; HIGH TEMPERATURE RESEARCH; *THERMAL STRESSES; THERMAL EXPANSION; MEASUREMENT; DEFORMATION; MECHANICAL PROPERTIES; ELASTICITY; TEMPERATURE; STRESSES; MATHEMATICAL ANALYSIS.) (HEATING; TEST EQUIPMENT; STRAIN GAGES; OPTICAL INSTRUMENTS; EXTENSOMETERS; COLLIMATORS; AERODYNAMIC HEATING; SIMULATION.) RE-ENTRY VEHICLES; MATERIALS; STRUCTURES.
INSTITUTE OF ENGINEERING RESEARCH; U. OF CALIF.; BERKELEY.
AD-274 375 62-3-1 DIV. 14

***GREEN'S FUNCTION**

(*ELECTROMAGNETIC WAVES; PROPAGATION; WAVEGUIDES; MAGNETIC FIELDS; ELECTRIC CURRENTS.) (*PARTIAL DIFFERENTIAL EQUATIONS; *GREEN'S FUNCTION.) (PLASMA PHYSICS; MATHEMATICAL ANALYSIS; THESES.)
RADIATION LAB.; U. OF MICHIGAN; ANN ARBOR.
AD-274 013 62-3-1 DIV. 25

(*ERRORS; ESTIMATION OF A FINITE DIFFERENCE ANALOGUE OF *GREEN'S FUNCTION FOR ELLIPTIC EQUATIONS; *PARTIAL DIFFERENTIAL EQUATIONS.) (OPERATORS (MATHEMATICS); REAL NUMBERS; *DIFFERENCE EQUATIONS.)
INSTITUTE FOR FLUID DYNAMICS AND APPLIED MATHEMATICS; U. OF MARYLAND; COLLEGE PARK.
AD-274 315 62-3-1 DIV. 15

***GROUPS (MATHEMATICS)**

(MATHEMATICAL LOGIC; *ALGEBRA; *GROUPS (MATHEMATICS).)
HAMBURG U. (GERMANY).
AD-274 002 62-3-1 DIV. 15

(*ALGEBRAIC TOPOLOGY; *TRANSFORMATIONS (MATHEMATICS); *GROUPS (MATHEMATICS).) (SPHERES; POLYNOMIALS; SEQUENCES; DIFFERENTIAL EQUATIONS.)
PENNSYLVANIA U.; PHILADELPHIA.
AD-274 284 62-3-1 DIV. 15

***GUIDED MISSILE BATTERIES**

(*GUIDED MISSILE BATTERIES; DESIGN; SPACESHIPS; SATELLITE VEHICLES; *POWER SUPPLIES.) (*LIQUID METALS; PHYSICAL PROPERTIES; CHEMICAL PROPERTIES; ELECTRICAL PROPERTIES; POTASSIUM; MERCURY; POTASSIUM ALLOYS; MERCURY ALLOYS; ELECTRODES.) (SALTS; POTASSIUM COMPOUNDS; HYDROXIDES; BROMIDES; IODIDES; ELECTROLYTES.) (*ELECTROLYTIC CELLS; *ELECTROCHEMISTRY; THEORY; ALKALINE CELLS.) (BATTERY COMPARTMENTS; MATERIALS; STEEL; STAINLESS STEEL; TUNGSTEN; MOLYBDENUM; CHROMIUM; ALUMINUM COMPOUNDS; MAGNESIUM COMPOUNDS; PHYSICAL PROPERTIES; THERMAL EXPANSION.) ELECTRIC INSULATION; CERAMIC MATERIALS; OXIDES; BATTERY SEPARATORS.
ALLISON DIV., GENERAL MOTORS CORP.; INDIANAPOLIS; IND.
AD-274 197 62-3-1 DIV. 7

***GUIDED MISSILE LAUNCHERS**

(*HUMAN ENGINEERING; *GUIDED MISSILE LAUNCHERS; MAINTENANCE; OPERATION; CONTROL PANELS; DISPLAY SYSTEMS.) (*SAFETY; HAZARDS; MAINTENANCE PERSONNEL.)
AMERICAN MACHINE AND FOUNDRY CO.; GREENWICH; CONN.
AD-274 290 62-3-1 DIV. 12

(*HUMAN ENGINEERING; *GUIDED MISSILE LAUNCHERS; MAINTENANCE; OPERATION; CONTROL PANELS; DISPLAY SYSTEMS.) (*SAFETY; HAZARDS; MAINTENANCE PERSONNEL; PORTABLE PLATFORMS; DOLLIES.)
AMERICAN MACHINE AND FOUNDRY CO.; GREENWICH; CONN.
AD-274 291 62-3-1 DIV. 12

(*HUMAN ENGINEERING; *GUIDED MISSILE LAUNCHERS; MAINTENANCE; ERRORS; ANALYSIS; OPERATION; CONTROL PANELS; DISPLAY SYSTEMS; *SAFETY.)
AMERICAN MACHINE AND FOUNDRY CO.; GREENWICH; CONN.
AD-274 292 62-3-1 DIV. 12

***GUIDED MISSILE NOSES**

(*GUIDED MISSILE NOSES; CONICAL BODIES; *IND TUNNEL MODELS; *HEAT TRANSFER; LAMINAR BOUNDARY LAYER; TURBULENT FLOW; TURBULENCE; BOUNDARY LAYER; HYPERSONICS; MODEL TESTS; MATHEMATICAL PREDICTION; THEORY.)
POLYTECHNIC INST. OF BROOKLYN; N. Y.
AD-274 122 62-3-1 DIV. 9

***GUIDED MISSILES**

(*GUIDED MISSILES; EXHAUST GASES OR *CONDENSATION TRAILS OF *LIGHT AND *LUMINESCENCE WITH RESPECT TO VELOCITY AND DISTANCE OF *PARTICLES EJECTED IN *UPPER ATMOSPHERE.) (AERODYNAMICS; *DRAG; GRAVITY; DIFFERENTIAL EQUATIONS; INTEGRATION; TABLES.)
GEOPHYSICS CORP. OF AMERICA; BEDFORD; MASS.
AD-273 972 62-3-1 DIV. 25

(*GUIDED MISSILES; SURFACE TO SURFACE; *INTERCEPTION PROBABILITIES USING *SATELLITE VEHICLES; PROBABILITY; STATISTICAL FUNCTIONS; POLYNOMIALS; MATHEMATICAL ANALYSIS.)
AIR FORCE OFFICE OF SCIENTIFIC RESEARCH; WASHINGTON; D. C.
AD-273 996 62-3-1 DIV. 12

(ANALYSIS OF A *GUIDED MISSILE ON A *MISSILE LAUNCHER.) (INTEGRAL EQUATION OF MOTION ON *FLEXIBLE BEAMS AND GUIDED MISSILE; NUMERICAL ANALYSIS IS DEVELOPED FOR SOLUTION.) (BEAMS; LOADING; DYNAMICS.)
ILLINOIS U.; URBANA.
AD-274 209 62-3-1 DIV. 25

***GUSTS**

(AIRPORTS; AIR FORCE; NEVADA; *GUSTS; WEATHER FORECASTING.)
4TH WEATHER WING; COLORADO SPRINGS; COLO.
AD-273 963 62-3-1 DIV. 2

(*WIND; *GUSTS; HURRICANES; VELOCITY.)
4TH WEATHER GROUP; EGLIN AIR FORCE BASE; FLA.
AD-274 240 62-3-1 DIV. 2

***HALOCARBONS**

(*ETHANES; *HALOCARBONS; *FLUORIDES; CHLORIDES; BROMIDES; SUBSTITUTES; ISOMER; NUCLEAR MAGNETIC RESONANCE; INFRARED SPECTROSCOPY; MOLECULAR SPECTROSCOPY; CHEMICAL BONDS; THEORY; TEMPERATURE.) ATOMS; FLUORINE; PROTONS; RESONANCE.
NOYES CHEMICAL LAB., U. OF ILLINOIS, URBANA.
AD-274 056 62-3-1 DIV. 4

***HANDBOOKS**

(*AVIATION FUELS; *JET ENGINE FUELS; *HANDBOOKS; USSR; THERMOCHEMISTRY; HEAT; *THERMODYNAMICS; VISCOSITY; DENSITY; SURFACE TENSION; VAPORIZATION; THERMAL CONDUCTIVITY; PHYSICAL PROPERTIES; TEST METHODS; TEST EQUIPMENT; TESTS.) KEROSENE; GASOLINE; HEPTANES; HYDROCARBONS.
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 118 62-3-1 DIV. 10

***HEAT EXCHANGERS**

(*HEAT EXCHANGERS; LIQUEFIED GASES; HYDROGEN; NITROGEN; THERMODYNAMICS; HIGH PRESSURE RESEARCH; LOW TEMPERATURE RESEARCH; CRYOGENICS; DESIGN.)
MATERIALS CENTRAL, AERONAUTICAL SYSTEMS DIV., WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 188 62-3-1 DIV. 25

***HEAT RESISTANT ALLOYS**

(*HEAT RESISTANT ALLOYS; *TITANIUM ALLOYS; NIOBIUM ALLOYS; ALUMINUM ALLOYS; TIN ALLOYS; HAFNIUM ALLOYS; ZIRCONIUM ALLOYS; SHEETS; MANUFACTURING METHODS; MECHANICAL PROPERTIES; TENSILE PROPERTIES; DENSITY; OXIDATION; RESISTANCE; HIGH TEMPERATURE RESEARCH.) (MELTING; ELECTRIC ARCS; FORGING; ROLLING MILLS; HEAT TREATMENT.)
ARMOUR RESEARCH FOUNDATION, CHICAGO, ILL.
AD-274 037 62-3-1 DIV. 17

(*CRYOGENICS; *ADHESIVES; *RESIN ADHESIVES; STAINLESS STEEL (301, 304, 310); ALUMINUM ALLOYS (2014, 2219, 5456); TITANIUM ALLOYS; FRACTURE (MECHANICS); MECHANICAL PROPERTIES.) (SPACE ENVIRONMENTAL CONDITIONS; PNEUMATIC DEVICES; PLASTICS; ELASTOMERS; ADHESION; LUBRICATION; THERMAL EXPANSION; THERMAL INSULATION.) (*HIGH TEMPERATURE RESEARCH; *HEAT RESISTANT ALLOYS; REFRACTORY MATERIALS; STAINLESS STEEL (301, M11); TITANIUM ALLOYS; REFRACTORY COATINGS; *METALS; *ALLOYS; NIOBIUM ALLOYS (FS 82).) (SPACESHIPS; SATELLITE VEHICLES.)
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
AD-274 211 62-3-1 DIV. 14

***HEAT RESISTANT POLYMERS**

(*RESIN ADHESIVES; *HEAT RESISTANT POLYMERS; HIGH TEMPERATURE RESEARCH; SYNTHESIS; MECHANICAL PROPERTIES; MOLECULAR WEIGHT; MOLECULAR STRUCTURE; SPECTROGRAPHIC ANALYSIS.) (*POLYMERS; METHYL RADICALS; BROMIDES; METHANES; ALLYL RADICALS; PHENOLS; POLYMERIZATION; COPOLYMERIZATION.) (*ADHESIVES FOR STAINLESS STEEL; MANUFACTURING METHODS; TEST METHODS.)
BORDEN CO., PHILADELPHIA, PA.
AD-274 289 62-3-1 DIV. 14

(ROCKET CASES; COMBUSTION CHAMBER LINERS FOR SOLID ROCKET PROPELLANTS; *THERMAL INSULATION; POLYMERS; *HEAT RESISTANT POLYMERS.) (SYNTHESIS BY COPOLYMERIZATION; VINYL RADICALS; *METALORGANIC COMPOUNDS; *SILICON COMPOUNDS; *TIN COMPOUNDS; *TITANIUM COMPOUNDS; *CHELATE COMPOUNDS; PROCESSING; AGING WITH CATALYSTS.)
HUGHES AIRCRAFT CO., CULVER CITY, CALIF.
AD-274 393 62-3-1 DIV. 27

***HEAT TRANSFER**

(*BIBLIOGRAPHY ON *HEAT TRANSFER AT SUPERSONICS, HYPERSONICS.) (AIRFRAMES; METAL PLATES; SURFACES; AERODYNAMIC HEATING; LAMINAR BOUNDARY LAYER; TURBULENT BOUNDARY LAYER; BOUNDARY LAYER; TURBULENCE; PRESSURE; TEMPERATURE.)
MINNESOTA U., MINNEAPOLIS.
AD-274 109 62-3-1 DIV. 9

(*GUIDED MISSILE NOSES; CONICAL BODIES; WIND TUNNEL MODELS; *HEAT TRANSFER; LAMINAR BOUNDARY LAYER; TURBULENT FLOW; TURBULENCE; BOUNDARY LAYER; HYPERSONICS; MODEL TESTS; MATHEMATICAL PREDICTION; THEORY.)
POLYTECHNIC INST. OF BROOKLYN, N. Y.
AD-274 122 62-3-1 DIV. 9

(*TRANSDUCERS; *PRESSURE; MEASUREMENT; DESIGN; TESTS; CALIBRATION.) (*HEAT TRANSFER; VIBRATION; OSCILLATION; DAMPING; STABILITY OF LIQUID ROCKET PROPELLANTS; COMBUSTION; ROCKET MOTORS; COMBUSTION CHAMBERS.) NON-DESTRUCTIVE TESTING; ROCKET MOTORS.
PRINCETON U., N. J.
AD-274 124 62-3-1 DIV. 10

(*ROCKET MOTOR NOZZLES; ROCKET MOTORS; SOLID ROCKET PROPELLANTS; *REFRACTORY MATERIALS; CERAMIC MATERIALS; *THERMAL INSULATION; THERMAL CONDUCTIVITY; *HEAT TRANSFER; TEMPERATURE; COMBUSTION CHAMBER GASES; PRESSURE; DESIGN; DEPOSITS.) TUNGSTEN; GRAPHITE; CARBIDES; PLASTICS; PHENOLIC RESINS; ASBESTOS FIBER; STEEL.
AEROJET-GENERAL CORP., SACRAMENTO, CALIF.
AD-274 140 62-3-1 DIV. 27

(*HEAT TRANSFER IN DISSOCIATION; AIR BY A TBO THICKNESS *INTEGRALS METHOD; THERMODYNAMICS; TRANSPORT PROPERTIES; GAS FLOW.) (POLYNOMIALS; TRANSFORMATIONS (MATHEMATICS); DIFFERENTIAL EQUATIONS.) ZERO PRESSURE IN *LAMINAR BOUNDARY LAYER.
NAVAL ORDNANCE LAB., WHITE OAK, MD.
AD-274 321 62-3-1 DIV. 9

***HEATERS**

(*HYPERSONIC WIND TUNNELS; *HEATERS; ELECTRIC ARCS; MAGNETIC FIELDS; *ELECTRODES; CONFIGURATION; CATHODES OF TUNGSTEN ALLOYS; THORIUM ALLOYS; COPPER ELECTRODES; COPPER; ANODES.) (TEST FACILITIES; RE-ENTRY AERODYNAMICS; AERODYNAMIC HEATING; SIMULATION; GAS FLOW; ELECTRIC POTENTIAL; PRESSURE.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 329 62-3-1 DIV. 30

***HELICAL ANTENNAS**

(*HELICAL ANTENNAS; BROADBAND; *ANTENNA RADIATION PATTERNS; ELECTROMAGNETIC FIELDS; POLARIZATION; PHASE MEASUREMENT; MATHEMATICAL ANALYSIS.) (*ANTENNAS; HELIXES; *TRANSMISSION LINES; WAVEGUIDE SLOTS; BROADBAND PROBES; TEST EQUIPMENT.) BICONICAL ANTENNAS; ANTENNA HORNS.
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY.
AD-274 238 62-3-1 DIV. 8

***HELICOPTERS**

(*HELICOPTERS; REDUCTION OF *STATIC ELECTRICITY BY *ELECTRIC DISCHARGES; ELECTRICAL CORONA; MATHEMATICAL ANALYSIS.) (HELICOPTERS; HAZARDS; *AVIATION SAFETY; ANALYSIS; COUNTERMEASURES.) (ATMOSPHERE; ATMOSPHERICS; ELECTRICAL PROPERTIES.)
PRINCETON U., N. J.
AD-273 976 62-3-1 DIV. 1

***HIGH SPEED CAMERAS**

(*HIGH SPEED CAMERAS HAVING *IMAGE CONVERTER TUBES; IMAGE INTENSIFIERS (ELECTRONICS); *CAMERA SHUTTERS; DESIGN.) (INTERFEROMETERS; SCHLIEREN PHOTOGRAPHY; HIGH SPEED PHOTOGRAPHY; GAS FLOW; AERODYNAMICS.)
RAULAND CORP., CHICAGO, ILL.
AD-274 353 62-3-1 DIV. 24

***HIGH SPEED PHOTOGRAPHY**

(*WIRE; TUNGSTEN WIRE; THIN FILMS; *DETONATION; PHOTOGRAPHIC ANALYSIS; *HIGH SPEED PHOTOGRAPHY; MOTION PICTURE CAMERAS; ALUMINUM; METAL FILMS; *ELECTRIC DETONATORS; ELECTRIC DISCHARGES; ENERGY.)
AEROJET-GENERAL CORP., DOWNEY, CALIF.
AD-274 293 62-3-1 DIV. 22

***HIGH TEMPERATURE RESEARCH**

(*CRYOGENICS; *ADHESIVES; *RESIN ADHESIVES; STAINLESS STEEL (301, 304, 310); ALUMINUM ALLOYS (2014, 2219, 5456); TITANIUM ALLOYS; FRACTURE (MECHANICS); MECHANICAL PROPERTIES.) (SPACE ENVIRONMENTAL CONDITIONS; PNEUMATIC DEVICES; PLASTICS; ELASTOMERS; ADHESION; LUBRICATION; THERMAL EXPANSION; THERMAL INSULATION.) (*HIGH TEMPERATURE RESEARCH; *HEAT RESISTANT ALLOYS; REFRACTORY MATERIALS; STAINLESS STEEL (301, M11); TITANIUM ALLOYS; REFRACTORY COATINGS; *METALS; *ALLOYS; NIOBIUM ALLOYS (FS 82).) (SPACESHIPS; SATELLITE VEHICLES.)
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
AD-274 211 62-3-1 DIV. 14

***HUMAN ENGINEERING**

(*BIBLIOGRAPHY; *MAINTENANCE; *HUMAN ENGINEERING.) (*AUTOMATION; MAINTENANCE PERSONNEL; TRAINING; ATTENTION.) (ELECTRONIC EQUIPMENT; COMPUTERS; FLIGHT INSTRUMENTS.) (TIME; COSTS; QUALITY CONTROL.)
RAND CORP., SANTA MONICA, CALIF.
AD-274 039 62-3-1 DIV. 26

(*SPACE FLIGHT; *MANNED; *SCIENTIFIC RESEARCH; SPACE MEDICINE; BEHAVIOR; *HUMAN ENGINEERING; STRESS (PHYSIOLOGY); STRESS (PSYCHOLOGY).) (*COMPUTERS; LOGISTICS; COSTS.) (*PERSONNEL; SCIENTIFIC PERSONNEL; ENGINEERING PERSONNEL; TRAINING.) SPACE ENVIRONMENTAL CONDITIONS; SIMULATION.
CORNELL AERONAUTICAL LAB., INC., BUFFALO, N. Y.
AD-274 053 62-3-1 DIV. 12

(*HUMAN ENGINEERING; *GUIDED MISSILE LAUNCHERS; MAINTENANCE; OPERATION; CONTROL PANELS; DISPLAY SYSTEMS.) (*SAFETY; HAZARDS; MAINTENANCE PERSONNEL.)
AMERICAN MACHINE AND FOUNDRY CO., GREENWICH, CONN.
AD-274 290 62-3-1 DIV. 12

(*HUMAN ENGINEERING; *GUIDED MISSILE LAUNCHERS; MAINTENANCE; OPERATION; CONTROL PANELS; DISPLAY SYSTEMS.) (*SAFETY; HAZARDS; MAINTENANCE PERSONNEL; PORTABLE PLATFORMS; DOLLIES.)
AMERICAN MACHINE AND FOUNDRY CO., GREENWICH, CONN.
AD-274 291 62-3-1 DIV. 12

(*HUMAN ENGINEERING; *GUIDED MISSILE LAUNCHERS; MAINTENANCE; ERRORS; ANALYSIS; OPERATION; CONTROL PANELS; DISPLAY SYSTEMS; *SAFETY.)
AMERICAN MACHINE AND FOUNDRY CO., GREENWICH, CONN.
AD-274 292 62-3-1 DIV. 12

***HYBRID ROCKET PROPELLANTS**

(*HYBRID ROCKET PROPELLANTS; ROCKET OXIDIZERS; COMBUSTION; THEORY; MATHEMATICAL ANALYSIS; REYNOLDS NUMBER.) (OXYGEN; ALUMINUM; ACRYLIC RESINS; POLYMERS; STYRENES; ETHYLENES.) (COMBUSTION CHAMBER GASES; TEST METHODS.)
ROCKETDYNE, CANOGA PARK, CALIF.
AD-274 077 62-3-1 DIV. 10

***HYDRAULIC GEAR FLUIDS**

(*GEARS; LUBRICATION; HIGH PRESSURE RESEARCH; HIGH TEMPERATURE RESEARCH; FAILURE (MECHANICS); HARDNESS.) (*LUBRICANTS; *MINERAL OILS; *HYDRAULIC GEAR FLUIDS; OILS; SILICONES; SILICATES; ESTERS; LUBRICANT ADDITIVES; PHOSPHORUS COMPOUNDS; FILMS; VISCOSITY; LOADING.)
SHELL DEVELOPMENT CO., EMERYVILLE, CALIF.
AD-273 955 62-3-1 DIV. 20

***HYDRAZINE DERIVATIVES**

(*HYDRAZINE DERIVATIVES; BODY FLUIDS; BLOOD; URINE; ANALYSIS; COLORIMETRY.) (PROPELLANTS; TOXICITY.)
AEROSPACE MEDICAL LAB., AERONAUTICAL SYSTEMS DIV., WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-273 986 62-3-1 DIV. 16

***HYDROCARBONS**

(MIXTURES; *HYDROCARBONS; *GLASS; *LOW TEMPERATURE RESEARCH; FREEZING; PHYSICAL PROPERTIES; VISCOSITY; MELTING.) (PENTANES; HEXANES; CYCLOHEXANES.) (ALKYL RADICALS; *SULFIDES; *THIOLS; *IODINE; ETHYL RADICALS; HYDROGEN COMPOUNDS; *IODIDES; ORGANIC SOLVENTS; HYDROCARBONS; *PHOTOLYSIS; PHOTOCHEMICAL REACTIONS.)
LUND U. (SWEDEN).
AD-274 160 62-3-1 DIV. 4

***HYDRODYNAMICS**

(BEARINGS; *BALL BEARINGS; *ROLLER BEARINGS; LUBRICATION; FATIGUE (MECHANICS).) (*LUBRICATION; *ELASTICITY; DEFORMATION; *HYDRODYNAMICS, THEORY.) (FILMS; ELECTRICAL CONDUCTANCE; X-RAY SPECTROSCOPY.) (SURFACES; FAILURE (MECHANICS); METALS; TRANSPORT PROPERTIES; TRACER STUDIES.) TEST EQUIPMENT; LUBRICANTS.
SKF INDUSTRIES, INC., PHILADELPHIA, PA.
AD-274 137 62-3-1 DIV. 26

***HYPERSONIC FLOW**

(*AERODYNAMIC CONFIGURATIONS; *LAMINAR BOUNDARY LAYER; *COMPRESSIBLE FLOW; SUBSONIC FLOW; SUPERSONIC FLOW; *HYPERSONIC FLOW; VISCOSITY.) (*BOUNDARY LAYER; *EQUATIONS; *NUMERICAL ANALYSIS; *DIFFERENTIAL EQUATIONS; *DIFFERENCE EQUATIONS; *PARTIAL DIFFERENTIAL EQUATIONS.) (SHEETS (FLAT PLATES); SHEAR STRESSES; HEAT TRANSFER; STABILITY; SHOCK WAVES.)
STANFORD U., CALIF.
AD-273 983 62-3-1 DIV. 9

***HYPERSONIC WIND TUNNELS**

(*HYPERSONIC WIND TUNNELS; *HEATERS; ELECTRIC ARCS; MAGNETIC FIELDS; *ELECTRODES; CONFIGURATION; CATHODES OF TUNGSTEN ALLOYS; THORIUM ALLOYS; COPPER ELECTRODES; COPPER; ANODES.) (TEST FACILITIES; RE-ENTRY AERODYNAMICS; AERODYNAMIC HEATING; SIMULATION; GAS FLOW; ELECTRIC POTENTIAL; PRESSURE.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 329 62-3-1 DIV. 30

*HYPERVELOCITY PROJECTILES

(*HYPERVELOCITY PROJECTILES; BALLISTICS; VELOCITY; TERMINAL BALLISTICS; STATISTICAL FUNCTIONS; COMPLEX VARIABLES; DIGITAL COMPUTERS.) (*TARGETS; CRATERING; DENSITY; STRESSES; TENSILE PROPERTIES; FRACTURE (MECHANICS); TEMPERATURE; HARDNESS; PENETRATION; MEASUREMENT; MATHEMATICAL PREDICTION.
HAYES INTERNATIONAL CORP., BIRMINGHAM, ALA.
AD-273 990 62-3-1 DIV. 22

(*HYPERVELOCITY PROJECTILES; *IMPACT SHOCK; PLASTIC FLOW; VISCOSITY; DEFORMATION; HYDRODYNAMICS.)
SPACE SCIENCES LAB., GENERAL ELECTRIC CO., PHILADELPHIA, PA.
AD-273 992 62-3-1 DIV. 25

(*IMPACT SHOCK FROM *HYPERVELOCITY PROJECTILES; METEORITES; *CRATERING; CAVITATION; VISCOSITY; STRESSES; MATHEMATICAL ANALYSIS; EQUATIONS; THEORY.)
SPACE SCIENCES LAB., GENERAL ELECTRIC CO., PHILADELPHIA, PA.
AD-274 048 62-3-1 DIV. 9

*IDENTIFICATION

(*NEUTRON SPECTROSCOPY; NEUTRONS; ENERGY; MEASUREMENT; ANALYSIS.) (SEMICONDUCTORS; NEUTRON SPECTROMETERS; SODIUM COMPOUNDS; ISOTOPES; IODINE COMPOUNDS; NEUTRON CAPTURE OF GAMMA RAY SPECTROSCOPY.) (QUARTZ CRYSTALS (SPECTROMETERS); ALPHA SPECTRA; ANALYSIS FOR BORON COMPOUNDS.) (IDENTIFICATION OF IMPURITIES IN *ELECTRONICS; *MATERIALS.) RESEARCH REACTORS.
MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
AD-274 320 62-3-1 DIV. 20

*ILLUMINATION

(*VISUAL ACUITY; VISIBILITY; RANGE; FOG; CLOUDS; *ILLUMINATION.)
INTERMOUNTAIN WEATHER, INC., SALT LAKE CITY, UTAH.
AD-274 397 62-3-1 DIV. 16

*IMAGE CONVERTER TUBES

(*HIGH SPEED CAMERAS HAVING *IMAGE CONVERTER TUBES; IMAGE INTENSIFIERS (ELECTRONICS); *CAMERA SHUTTERS; DESIGN.) (INTERFEROMETERS; SCHLIEREN PHOTOGRAPHY; HIGH SPEED PHOTOGRAPHY; GAS FLOW; AERODYNAMICS.)
RAULAND CORP., CHICAGO, ILL.
AD-274 353 62-3-1 DIV. 24

*IMPACT SHOCK

(*HYPERVELOCITY PROJECTILES; *IMPACT SHOCK; PLASTIC FLOW; VISCOSITY; DEFORMATION; HYDRODYNAMICS.)
SPACE SCIENCES LAB., GENERAL ELECTRIC CO., PHILADELPHIA, PA.
AD-273 992 62-3-1 DIV. 25

(*IMPACT SHOCK FROM *HYPERVELOCITY PROJECTILES; METEORITES; *CRATERING; CAVITATION; VISCOSITY; STRESSES; MATHEMATICAL ANALYSIS; EQUATIONS; THEORY.)
SPACE SCIENCES LAB., GENERAL ELECTRIC CO., PHILADELPHIA, PA.
AD-274 048 62-3-1 DIV. 9

*IMPURITIES

(*NEUTRON SPECTROSCOPY; NEUTRONS; ENERGY; MEASUREMENT; ANALYSIS.) (SEMICONDUCTORS; NEUTRON SPECTROMETERS; SODIUM COMPOUNDS; ISOTOPES; IODINE COMPOUNDS; NEUTRON CAPTURE OF GAMMA RAY SPECTROSCOPY.) (QUARTZ CRYSTALS (SPECTROMETERS); ALPHA SPECTRA; ANALYSIS FOR BORON COMPOUNDS.) (IDENTIFICATION OF IMPURITIES IN *ELECTRONICS; *MATERIALS.) RESEARCH REACTORS.
MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
AD-274 320 62-3-1 DIV. 20

*INDUSTRIAL EQUIPMENT

(GLIDERS; RE-ENTRY VEHICLES; STRUCTURES; MATERIALS.) (*TEXTILES; *METALLIC TEXTILES; WIRE; NICKEL ALLOYS (RENE 41); COBALT ALLOYS; *SYNTHETIC FIBERS; DACRON; NYLON THREAD; NYLON; THREADS; *INDUSTRIAL EQUIPMENT; *MACHINES; DESIGN; SPECIFICATIONS.)
GOODYEAR AIRCRAFT CORP., AKRON, OHIO.
AD-274 309 62-3-1 DIV. 14

*INEQUALITIES

(*TOPOLOGY; *LINEAR PROGRAMMING; *ALGEBRA; INTEGRALS; *INEQUALITIES; DIFFERENTIAL EQUATIONS; GEOMETRY; SEQUENCES.) *NUMERICAL ANALYSIS.
NORTHWESTERN TECHNOLOGICAL INST., EVANSTON, ILL.
AD-274 256 62-3-1 DIV. 15

*INFRARED TRACKING

(*WIND; MEASUREMENT; INSTRUMENTATION; FEASIBILITY STUDIES.) (TURBULENCE; RADAR; *DOPPLER TRACKING.) (RADAR; DOPPLER TRACKING; *ACOUSTIC DETECTORS.) (AIR; HEAT; BUBBLES; *INFRARED TRACKING.)
MIDWEST RESEARCH INST., KANSAS CITY, MO.
AD-274 334 62-3-1 DIV. 2

*INJECTORS

(*SUPERSONIC WIND TUNNELS; DESIGN.) (*SUPERSONIC DIFFUSERS; *INJECTORS; CONFIGURATION; FEASIBILITY STUDIES; EFFECTIVENESS; PRESSURE.)
ARNOLD ENGINEERING DEVELOPMENT CENTER; ARNOLD AIR FORCE STATION, TENN.
AD-274 219 62-3-1 DIV. 30

*INTEGRALS

(*HEAT TRANSFER IN DISSOCIATION; AIR BY A TBO THICKNESS *INTEGRALS METHOD; THERMODYNAMICS; TRANSPORT PROPERTIES; GAS FLOW.) (POLYNOMIALS; TRANSFORMATIONS (MATHEMATICS); DIFFERENTIAL EQUATIONS.) ZERO PRESSURE IN *LAMINAR BOUNDARY LAYER.
NAVAL ORDNANCE LAB., WHITE OAK, MD.
AD-274 321 62-3-1 DIV. 9

*INTERCEPTION PROBABILITIES

(*GUIDED MISSILES; SURFACE TO SURFACE; *INTERCEPTION PROBABILITIES USING *SATELLITE VEHICLES; PROBABILITY; STATISTICAL FUNCTIONS; POLYNOMIALS; MATHEMATICAL ANALYSIS.)
AIR FORCE OFFICE OF SCIENTIFIC RESEARCH, WASHINGTON, D. C.
AD-273 996 62-3-1 DIV. 12

*INTERMETALLIC COMPOUNDS

(*SEMICONDUCTORS; SANDWICH CONSTRUCTION; *SINGLE CRYSTALS; GROWTH; MANUFACTURING METHODS; IMPURITIES; ELECTRICAL PROPERTIES; RESISTANCE; HALL EFFECT; *INTERMETALLIC COMPOUNDS.) (DEPOSITS OF GALLIUM ON GALLIUM COMPOUNDS; ARSENIDES AND CHROMIUM ON SILICON COMPOUNDS; CARBIDES.) (PENETRATION OF GALLIUM INTO GALLIUM COMPOUNDS; ARSENIDES.) CRYSTAL OVENS; LABORATORY EQUIPMENT.
TYCO, INC., WALTHAM, MASS.
AD-274 275 62-3-1 DIV. 25

*INTERSTELLAR MATTER

(FLIGHT TESTING OF *SOUNDING ROCKETS FOR MEASUREMENT OF SOLAR WINDS; PROTONS BEYOND OUTER RADIATION BELT.) (ANALYSIS OF FLIGHT PATHS OF TEST VEHICLES; SUPERSONIC TEST VEHICLES.) (POSITION FINDING OF SOUNDING ROCKETS FROM TELEMETERING DATA.) (RADAR TRACKING; OPTICAL TRACKING OF *ROCKETS ON UPPER ATMOSPHERE.) PROTONS; *INTERSTELLAR MATTER; TELEMETER SYSTEMS.
AIR FORCE SPECIAL WEAPONS CENTER; KIRTLAND AIR FORCE BASE, N. MEX.
AD-274 086 62-3-1 DIV. 2

*INVERTER CIRCUITS

(FREQUENCY MODULATION; *INVERTER CIRCUITS; DESIGN; RECTIFIERS FOR *POWER SUPPLIES; DIRECT CURRENT.) (POWER; *MODULATORS; *SWITCHING CIRCUITS, ELECTRONIC SWITCHES.) (SILICONES; SEMICONDUCTORS; RESISTORS; NONLINEAR SYSTEMS; SOLID STATE PHYSICS; ELECTRONIC CIRCUITS.)
ADVANCED ELECTRONICS CENTER; GENERAL ELECTRIC CO., ITHACA, N. Y.
AD-274 091 62-3-1 DIV. 7

*IODIDES

(MIXTURES; *HYDROCARBONS; *GLASS; *LOW TEMPERATURE RESEARCH, FREEZING; PHYSICAL PROPERTIES; VISCOSITY, MELTING.) (PENTANES; HEXANES; CYCLOHEXANES.) (ALKYL RADICALS; *SULFIDES; *THIOLS; *IODINE; ETHYL RADICALS; HYDROGEN COMPOUNDS; *IODIDES; ORGANIC SOLVENTS; HYDROCARBONS; *PHOTOLYSIS; PHOTOCHEMICAL REACTIONS.)
LUND U. (SWEDEN).
AD-274 160 62-3-1 DIV. 4

*IODINE

(MIXTURES; *HYDROCARBONS; *GLASS; *LOW TEMPERATURE RESEARCH, FREEZING; PHYSICAL PROPERTIES; VISCOSITY, MELTING.) (PENTANES; HEXANES; CYCLOHEXANES.) (ALKYL RADICALS; *SULFIDES; *THIOLS; *IODINE; ETHYL RADICALS; HYDROGEN COMPOUNDS; *IODIDES; ORGANIC SOLVENTS; HYDROCARBONS; *PHOTOLYSIS; PHOTOCHEMICAL REACTIONS.)
LUND U. (SWEDEN).
AD-274 160 62-3-1 DIV. 4

*ION ROCKETS

(*ELECTRIC PROPULSION; PLASMA JETS; ROCKET MOTORS; *ION ROCKETS; PRESSURE; SPECIFIC IMPULSE; THRUST; TESTS.) (TONS OF ARGON; OXYGEN.) (EXHAUST GASES; SPECTROGRAPHIC ANALYSIS; TEST METHODS; PHOTOELECTRIC EFFECT.) PLASMA PHYSICS.
SPACE SCIENCES LAB., GENERAL ELECTRIC CO., PHILADELPHIA, PA.
AD-274 217 62-3-1 DIV. 27

*IONIC CURRENT

(*IONIC CURRENT; ANODES; THERMIONIC EMISSION; SECONDARY EMISSION; SPACE CHARGES; *PLASMA PHYSICS; GAS DISCHARGES.)
USSR.
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 061 62-3-1 DIV. 8

*IONOSPHERE

(*IONOSPHERE; *IONS; ELECTRONS; *PHOTOELECTRIC EFFECT; ULTRAVIOLET RADIATION; OXYGEN; NITROGEN; NITROGEN COMPOUNDS; OXIDES.)
AIR FORCE CAMBRIDGE RESEARCH LABS., BEDFORD, MASS.
AD-273 999 62-3-1 DIV. 2

*IONOSPHERIC DISTURBANCES

(IONOSPHERE; ELECTRIC CURRENTS; *IONOSPHERIC DISTURBANCES; *MAGNETIC STORMS; PLASMA PHYSICS.)
RAND CORP., SANTA MONICA, CALIF.
AD-274 267 62-3-1 DIV. 2

*IONS

(*IONOSPHERE; *IONS; ELECTRONS; *PHOTOELECTRIC EFFECT; ULTRAVIOLET RADIATION; OXYGEN; NITROGEN; NITROGEN COMPOUNDS; OXIDES.)
AIR FORCE CAMBRIDGE RESEARCH LABS., BEDFORD, MASS.
AD-273 999 62-3-1 DIV. 2

*IRON

(*ALUMINUM; *MAGNESIUM; *IRON; *SINGLE CRYSTALS; *DEFORMATION; STRESSES; SHEAR STRESSES; PLASTIC FLOW; THEORY; PREPARATION.)
NOTRE DAME U., IND.
AD-274 116 62-3-1 DIV. 25

*IRREVERSIBLE PROCESSES

(*THERMODYNAMICS; *THEORY OF *ELASTICITY; VISCOSITY; *RELAXATION TIME.) (*IRREVERSIBLE PROCESSES; MATRIX ALGEBRA; INTEGRAL TRANSFORMS.)
NORTH CAROLINA STATE COLL., RALEIGH.
AD-274 248 62-3-1 DIV. 25

*ISOTOPES

(*GENERATORS; AUXILIARY POWER PLANTS; *THERMOELECTRICITY; *ISOTOPES; HEAT TRANSFER; HEAT EXCHANGERS, COOLING; MANUFACTURING METHODS.) (POWER PLANTS; POWER SUPPLIES; *ELECTRIC POWER PRODUCTION; *NUCLEAR POWER PLANTS; THERMAL CONDUCTIVITY; THERMOCOUPLES; IMPEDANCE MATCHING; TESTS.)
WESTINGHOUSE ELECTRIC CORP., CHESWICK, PA.
AD-274 280 62-3-1 DIV. 7

*JET ENGINE FUELS

(*AVIATION FUELS; *JET ENGINE FUELS; *HANDBOOKS; USSR; THERMOCHEMISTRY; HEAT; *THERMODYNAMICS; VISCOSITY; DENSITY; SURFACE TENSION; VAPORIZATION; THERMAL CONDUCTIVITY; PHYSICAL PROPERTIES; TEST METHODS; TEST EQUIPMENT; TESTS.) KEROSENE; GASOLINE; HEPTANES; HYDROCARBONS.
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 118 62-3-1 DIV. 10

*JET ENGINE NOISE

(TESTS; EFFECTIVENESS; *SUPPRESSORS; *JET ENGINE NOISE; ACOUSTIC INSULATION; SOUND; PRESSURE; SOUND TRANSMISSION; TEST FACILITIES.)
BOLT, BERANEK, AND NEWMAN, INC., CAMBRIDGE, MASS.
AD-273 987 62-3-1 DIV. 30

*JET MIXING FLOW

(*JETS; GAS FLOW; AERODYNAMICS; SUPERSONICS; HYPERSONICS; SHOCK WAVES; *JET MIXING FLOW; THEORY; EQUATIONS; MATHEMATICAL ANALYSIS; COMPUTERS.) (HIGH ALTITUDE; SATELLITE VEHICLES; AIRPLANES; AIRCRAFT; SATELLITE ATTITUDE; RE-ENTRY VEHICLES; CONTROL SYSTEMS.) INTERFERENCE.
GRUMMAN AIRCRAFT ENGINEERING CORP., BETHPAGE, N. Y.
AD-274 049 62-3-1 DIV. 9

***JET STREAMS (METEOROLOGY)**

(ATMOSPHERE; *TURBULENCE; *AVIATION ACCIDENTS.) (*JET STREAMS (METEOROLOGY); WIND; TEMPERATURE.) GRAVITY.
COLORADO STATE U. RESEARCH FOUNDATION, FORT COLLINS.
AD-274 376 62-3-1 DIV. 2

***JETS**

(*JETS; GAS FLOW; AERODYNAMICS; SUPERSONICS; HYPERSONICS; SHOCK WAVES; *JET MIXING FLOW; THEORY; EQUATIONS; MATHEMATICAL ANALYSIS; COMPUTERS.) (HIGH ALTITUDE; SATELLITE VEHICLES; AIRPLANES; AIRCRAFT; SATELLITE ATTITUDE; RE-ENTRY VEHICLES; CONTROL SYSTEMS.) INTERFERENCE.
GRUMMAN AIRCRAFT ENGINEERING CORP., BETHPAGE, N. Y.
AD-274 049 62-3-1 DIV. 9

***JOURNAL BEARINGS**

(*GAS BEARINGS; COMPRESSIBLE FLOW; VISCOSITY; FLUID FLOW.) (PARTIAL DIFFERENTIAL EQUATIONS; PERTURBATION THEORY.) (*JOURNAL BEARINGS; BEARINGS; *LUBRICATION.)
MECHANICAL TECHNOLOGY INC., LATHAM, N. Y.
AD-273 954 62-3-1 DIV. 9

***KLYSTRONS**

(*TRAVELING WAVE TUBES; *KLYSTRONS; *MICROWAVE AMPLIFIERS; ULTRA HIGH FREQUENCY; HELIXES; COUPLING CIRCUITS; S BAND; STANDING WAVE RATIOS; THEORY.) (AMPLIFIERS; ELECTRON TUBES; *ELECTRON GUNS; CATHODES (ELECTRON TUBES); SPACE CHARGES; NUMERICAL METHODS AND PROCEDURES; MATHEMATICAL ANALYSIS; THEORY.) (MAGNETRONS; ELECTRON BEAMS; PLASMA PHYSICS; ELECTRIC FIELDS; MAGNETIC FIELDS.)
ELECTRON PHYSICS LAB., U. OF MICHIGAN, ANN ARBOR.
AD-274 110 62-3-1 DIV. 8

***LAMINAR BOUNDARY LAYER**

(*AERODYNAMIC CONFIGURATIONS; *LAMINAR BOUNDARY LAYER; *COMPRESSIBLE FLOW; SUBSONIC FLOW; SUPERSONIC FLOW; *HYPERSONIC FLOW; VISCOSITY.) (*BOUNDARY LAYER; *EQUATIONS; *NUMERICAL ANALYSIS; *DIFFERENTIAL EQUATIONS; *DIFFERENCE EQUATIONS; *PARTIAL DIFFERENTIAL EQUATIONS.) (SHEETS (FLAT PLATES); SHEAR STRESSES; HEAT TRANSFER; STABILITY; SHOCK WAVES.)
STANFORD U., CALIF.
AD-273 983 62-3-1 DIV. 9

(*HEAT TRANSFER IN DISSOCIATION; AIR BY A TWO THICKNESS *INTEGRALS METHOD; THERMODYNAMICS; TRANSPORT PROPERTIES; GAS FLOW.) (POLYNOMIALS; TRANSFORMATIONS (MATHEMATICS); DIFFERENTIAL EQUATIONS.) ZERO PRESSURE IN *LAMINAR BOUNDARY LAYER.
NAVAL ORDNANCE LAB., WHITE OAK, MD.
AD-274 321 62-3-1 DIV. 9

***LAMINATES**

(*LAMINATES; *REINFORCING MATERIALS; *GLASS; GLASS TEXTILES; *MICA; DISKS; FILMS; PLASTICS; STRUCTURES; MATERIALS.) (PROCESSING; FILAMENT WOUND CONSTRUCTION; CASTING; MOLDING; HYDROSTATIC PRESSURE.) (TESTS; STRESSES; DEFORMATION; MECHANICAL PROPERTIES; ELECTRICAL PROPERTIES; TENSILE PROPERTIES.) (BEAMS; CYLINDRICAL BODIES; ROCKET MOTOR NOZZLES; CONTAINERS; SCREW THREADS; BATTERY COMPARTMENTS.)
NARMCO INDUSTRIES, INC., SAN DIEGO, CALIF.
AD-274 332 62-3-1 DIV. 14

***LEAD COMPOUNDS**

(*METALORGANIC COMPOUNDS; CARBON COMPOUNDS; *SILICON COMPOUNDS; *GERMANIUM COMPOUNDS; *TIN COMPOUNDS; *LEAD COMPOUNDS; PHENYL RADICALS; BENZENES; *LUMINESCENT MATERIALS; PHOSPHORESCENT MATERIALS; *LUMINESCENCE; PHOSPHORESCENCE; FLUORESCENCE; SPECTROGRAPHIC ANALYSIS; ULTRAVIOLET SPECTROSCOPY; ABSORPTION; ULTRAVIOLET RADIATION; EXCITATION; HALF LIFE; PHOSPHORESENT DECAY.) (THEORY; QUANTUM MECHANICS; ELECTRON TRANSITIONS.)
AERONAUTICAL RESEARCH LAB., OFFICE OF AEROSPACE RESEARCH; WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 295 62-3-1 DIV. 25

***LIGHT**

(*GUIDED MISSILES; EXHAUST GASES OR *CONDENSATION TRAILS OF *LIGHT AND *LUMINESCENCE WITH RESPECT TO VELOCITY AND DISTANCE OF *PARTICLES EJECTED IN *UPPER ATMOSPHERE.) (AERODYNAMICS; *DRAG; GRAVITY; DIFFERENTIAL EQUATIONS; INTEGRATION; TABLES.)
GEOPHYSICS CORP. OF AMERICA, BEDFORD, MASS.
AD-273 972 62-3-1 DIV. 25

(*LIGHT; *TRANSMISSION; *SCATTERING; FOG; HAZE; SMOKES; MEASUREMENT; INSTRUMENTATION.) (BALLOONS; PHOTOFLASH BULBS; CAMERAS.) LIGHT TRANSMISSION.
TECHNICAL OPERATIONS, INC., BURLINGTON, MASS.
AD-274 169 62-3-1 DIV. 25

***LIGHTNING**

(PHOTOGRAPHS OF *LIGHTNING; WATER; *WATER VAPOR; *UNDERWATER EXPLOSIONS; CONDUCTORS; PULSE GENERATORS; ELECTRIC FIELDS; ELECTRIC DISCHARGES.)
NAVAL ORDNANCE LAB., WHITE OAK, MD.
AD-274 322 62-3-1 DIV. 2

***LINEAR PROGRAMMING**

(*TOPOLOGY; *LINEAR PROGRAMMING; *ALGEBRA; INTEGRALS; *INEQUALITIES; DIFFERENTIAL EQUATIONS; GEOMETRY; SEQUENCES.) *NUMERICAL ANALYSIS.
NORTHWESTERN TECHNOLOGICAL INST., EVANSTON, ILL.
AD-274 238 62-3-1 DIV. 15

***LINEAR SYSTEMS**

*ELECTRONICS; *ELECTRONIC CIRCUITS; *SOLID STATE PHYSICS; SEMICONDUCTORS; PARAMETRIC AMPLIFIERS; ELECTRICAL NETWORKS; PULSE AMPLIFIERS; TRANSISTORS; OSCILLATORS; HARMONIC OSCILLATORS; AMPLIFIERS; FEEDBACK AMPLIFIERS; TRANSMISSION LINES; *COMPUTERS; *COMPUTER LOGIC; DIGITAL COMPUTERS; PROGRAMMING; THEORY; MACHINE TRANSLATION; SPECIAL FUNCTIONS; MICROWAVE AMPLIFIERS; *MICROWAVE EQUIPMENT; *PLASMA PHYSICS; WAVEGUIDES; MICROWAVES; PROPAGATION; MAGNETRONS; CYCLOTRONS; NOISE (RADIO); SLOT ANTENNAS; ANTENNAS; *ELECTROMAGNETIC WAVES; CRYSTALS; SELENIUM; LIGHT; PULSE MODULATION; CODING; LASERS; NUCLEAR MAGNETIC RESONANCE; THIN FILMS; GARNET; CONTROL SYSTEMS; *LINEAR SYSTEMS; *NONLINEAR SYSTEMS; SEQUENCES; DELAY LINES; INFORMATION THEORY; INFORMATION RETRIEVAL; TELEVISION EQUIPMENT; CIRCUIT BREAKERS; INVERTER CIRCUITS.
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY.
AD-274 101 62-3-1 DIV. 8

(*STATISTICAL PROCESSES IN SYNTHESIS OF *LINEAR SYSTEMS, NOISE.) (PROBABILITY; STATISTICAL FUNCTIONS; STATISTICAL DISTRIBUTIONS; *MATRIX ALGEBRA; DIFFERENTIAL EQUATIONS; LEAST SQUARES METHOD; MATHEMATICAL PREDICTION.) THESES.
CALIFORNIA U., LOS ANGELES.
AD-274 307 62-3-1 DIV. 15

(SYNTHESIS OF *LINEAR SYSTEMS (NONSTATIONARY) *FEEDBACK (SYSTEMS).) (*CONTROL SYSTEMS, POLYNOMIALS; FUNCTIONS, TIME; DIFFERENTIAL EQUATIONS; PARTIAL DIFFERENTIAL EQUATIONS.)
CALIFORNIA U., LOS ANGELES.
AD-274 230 62-3-1 DIV. 8

(SYNTHESIS OF *LINEAR SYSTEMS (NONSTATIONARY); *FEEDBACK SYSTEMS.) (*CONTROL SYSTEMS; ALGEBRA; *DIFFERENTIAL EQUATIONS, TIME, FUNCTIONS; POLYNOMIALS; TRANSFORMATIONS (MATHEMATICS); OPERATORS (MATHEMATICS).)
CALIFORNIA U., LOS ANGELES.
AD-274 231 62-3-1 DIV. 8

(*GUIDED MISSILE BATTERIES; DESIGN; SPACESHIPS; SATELLITE VEHICLES; *POWER SUPPLIES.) (*LIQUID METALS; PHYSICAL PROPERTIES; CHEMICAL PROPERTIES, ELECTRICAL PROPERTIES; POTASSIUM, MERCURY; POTASSIUM ALLOYS; MERCURY ALLOYS; ELECTRODES.) (SALTS; POTASSIUM COMPOUNDS; HYDROXIDES; BROMIDES; IODIDES; ELECTROLYTES.) (*ELECTROLYTIC CELLS; *ELECTROCHEMISTRY, THEORY; ALKALINE CELLS.) (BATTERY COMPARTMENTS; MATERIALS; STEEL; STAINLESS STEEL; TUNGSTEN; MOLYBDENUM; CHROMIUM; ALUMINUM COMPOUNDS; MAGNESIUM COMPOUNDS; PHYSICAL PROPERTIES; THERMAL EXPANSION.) ELECTRIC INSULATION; CERAMIC MATERIALS; OXIDES; BATTERY SEPARATORS.
ALLISON DIV., GENERAL MOTORS CORP., INDIANAPOLIS, IND.
AD-274 197 62-3-1 DIV. 7

***LIQUID ROCKET PROPELLANTS**

(*LIQUID ROCKET PROPELLANTS; IGNITION; *COMBUSTION; FLAMES; FLAME PROPAGATION; THEORY; MATHEMATICAL ANALYSIS; STATISTICAL ANALYSIS.)
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
AD-273 982 62-3-1 DIV. 10

(GUIDED MISSILES; BOOSTER ROCKETS; *LIQUID ROCKET PROPELLANTS; CRYOGENICS; LIQUEFIED GASES; HYDROGEN; FUEL TANKS; *PROPELLANT TANKS; TITANIUM; STAINLESS STEEL; THERMAL INSULATION; MANUFACTURING METHODS; WELDING; WELDS; CYLINDRICAL BODIES; CONICAL BODIES; HEMISPHERICAL SHELLS.) TEST EQUIPMENT; TEST FACILITIES; TEST METHODS; TESTS; HYDROSTATIC PRESSURE; DEFORMATION; STRAIN GAGES; TEMPERATURE; MEASUREMENT.
BEECH AIRCRAFT CORP., BOULDER, COLO.
AD-274 201 62-3-1 DIV. 10

***LOW TEMPERATURE RESEARCH**

(MIXTURES; *HYDROCARBONS; *GLASS; *LOW TEMPERATURE RESEARCH; FREEZING; PHYSICAL PROPERTIES; VISCOSITY; MELTING.) (PENTANES; HEXANES; CYCLOHEXANES.) (ALKYL RADICALS; *SULFIDES; *THIOLS; *IODINE; ETHYL RADICALS; HYDROGEN COMPOUNDS; *IODIDES; ORGANIC SOLVENTS; HYDROCARBONS; *PHOTOLYSIS; PHOTOCHEMICAL REACTIONS.)
LUND U. (SWEDEN).
AD-274 160 62-3-1 DIV. 4

(*GASES; DISSOCIATION.) (*LOW TEMPERATURE RESEARCH; MOLECULES; ENTROPY; SPECIFIC HEAT.) (*THERMODYNAMICS; ANALYSIS.) DIFFERENTIAL EQUATIONS.
AEROSPACE CORP., EL SEGUNDO, CALIF.
AD-274 222 62-3-1 DIV. 9

***LUBRICANTS**

(*GEARS; LUBRICATION; HIGH PRESSURE RESEARCH; HIGH TEMPERATURE RESEARCH; FAILURE (MECHANICS); HARDNESS.) (*LUBRICANTS; *MINERAL OILS; *HYDRAULIC GEAR FLUIDS; OILS; SILICONES; SILICATES; ESTERS; LUBRICANT ADDITIVES; PHOSPHORUS COMPOUNDS; FILMS; VISCOSITY; LOADING.)
SHELL DEVELOPMENT CO., EMERYVILLE, CALIF.
AD-273 955 62-3-1 DIV. 26

***LUBRICATION**

(*GAS BEARINGS; COMPRESSIBLE FLOW; VISCOSITY; FLUID FLOW.) (PARTIAL DIFFERENTIAL EQUATIONS; PERTURBATION THEORY.) (*JOURNAL BEARINGS; BEARINGS; *LUBRICATION.)
MECHANICAL TECHNOLOGY INC., LATHAM, N. Y.
AD-273 954 62-3-1 DIV. 9

(BEARINGS; *BALL BEARINGS; *ROLLER BEARINGS; LUBRICATION; FATIGUE (MECHANICS).) (*LUBRICATION; *ELASTICITY; DEFORMATION; *HYDRODYNAMICS, THEORY.) (FILMS; ELECTRICAL CONDUCTANCE; X-RAY SPECTROSCOPY.) (SURFACES; FAILURE (MECHANICS); METALS; TRANSPORT PROPERTIES; TRACER STUDIES.) TEST EQUIPMENT; LUBRICANTS.
SKF INDUSTRIES, INC., PHILADELPHIA, PA.
AD-274 137 62-3-1 DIV. 26

***LUMINESCENCE**

(*PHOSPHORS; *ZINC COMPOUNDS; *SULFIDES; POWDERS; *LUMINESCENT MATERIALS; *LUMINESCENCE; *PHOTOEMISSION; EXCITATION; VOLTAGE; SOLID STATE PHYSICS; THEORY.) DIELECTRICS.
NATIONAL ELECTROTECHNICAL INST. (ITALY).
AD-273 983 62-3-1 DIV. 25

(*GUIDED MISSILES; EXHAUST GASES OR *CONDENSATION TRAILS OF *LIGHT AND *LUMINESCENCE WITH RESPECT TO VELOCITY AND DISTANCE OF *PARTICLES EJECTED IN *UPPER ATMOSPHERE.) (AERODYNAMICS; *DRAG; GRAVITY; DIFFERENTIAL EQUATIONS; INTEGRATION; TABLES.)
GEOPHYSICS CORP. OF AMERICA, BEDFORD, MASS.
AD-273 972 62-3-1 DIV. 25

(*DIELECTRIC PROPERTIES; ELECTRONICS.) (*LUMINESCENCE; THERMAL DIFFUSION; GLOW DISCHARGES; LIGHT TRANSMISSION.) (SPECTROGRAPHIC CAMERAS; TEST EQUIPMENT.)
NATIONAL ELECTROTECHNICAL INST. (ITALY).
AD-274 007 62-3-1 DIV. 25

(ELECTROSTATIC FIELDS; *LUMINESCENCE; *POLARIZATION; ZINC COMPOUNDS; SULFIDES.)
NATIONAL ELECTROTECHNICAL INST. (ITALY).
AD-274 008 62-3-1 DIV. 8

(*METALORGANIC COMPOUNDS; CARBON COMPOUNDS; *SILICON COMPOUNDS; *GERMANIUM COMPOUNDS; *TIN COMPOUNDS; *LEAD COMPOUNDS; PHENYL RADICALS; BENZENES; *LUMINESCENT MATERIALS; PHOSPHORESCENT MATERIALS; *LUMINESCENCE; PHOSPHORESCENCE; FLUORESCENCE; SPECTROGRAPHIC ANALYSIS; ULTRAVIOLET SPECTROSCOPY; ABSORPTION; ULTRAVIOLET RADIATION; EXCITATION; HALF LIFE; PHOSPHORESENT DECAY.) (THEORY; QUANTUM MECHANICS; ELECTRON TRANSITIONS.)
AERONAUTICAL RESEARCH LAB., OFFICE OF AEROSPACE RESEARCH; WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 295 62-3-1 DIV. 25

***LUMINESCENT MATERIALS**

(*PHOSPHORS; *ZINC COMPOUNDS; *SULFIDES; POWDERS; *LUMINESCENT MATERIALS; *LUMINESCENCE; *PHOTOEMISSION; EXCITATION; VOLTAGE; SOLID STATE PHYSICS; THEORY.) DIELECTRICS.
NATIONAL ELECTROTECHNICAL INST. (ITALY).
AD-273 983 62-3-1 DIV. 25

(*METALORGANIC COMPOUNDS; CARBON COMPOUNDS; *SILICON COMPOUNDS; *GERMANIUM COMPOUNDS; *TIN COMPOUNDS; *LEAD COMPOUNDS; PHENYL RADICALS; BENZENES; *LUMINESCENT MATERIALS; PHOSPHORESCENT MATERIALS; *LUMINESCENCE; PHOSPHORESCENCE; FLUORESCENCE; SPECTROGRAPHIC ANALYSIS; ULTRAVIOLET SPECTROSCOPY; ABSORPTION; ULTRAVIOLET RADIATION; EXCITATION; HALF LIFE; PHOSPHORESENT DECAY.) (THEORY; QUANTUM MECHANICS; ELECTRON TRANSITIONS.)
AERONAUTICAL RESEARCH LAB., OFFICE OF AEROSPACE RESEARCH; WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 295 62-3-1 DIV. 25

***MACHINE TOOLS**

(HYDROSTATIC PRESSURE; *EXTRUSION; *STEEL; *TITANIUM ALLOYS; ALUMINUM ALLOYS; VANADIUM ALLOYS;) (*MACHINE TOOLS; HYDRAULIC PRESSES; DESIGN;) (HIGH PRESSURE RESEARCH; *DIES; HYDRAULIC FLUIDS; HYDRAULIC SEALS; METAL SEALS; RUBBER SEALS;) (STRESSES; MATHEMATICAL ANALYSIS; SHEAR STRESSES;)
BATTELLE MEMORIAL INST., COLUMBUS.
AD-274 372 62-3-1 DIV. 26

***MACHINES**

(GLIDERS; RE-ENTRY VEHICLES; STRUCTURES; MATERIALS;) (*TEXTILES; *METALLIC TEXTILES; *IRE; NICKEL ALLOYS (RENE 41); COBALT ALLOYS; *SYNTHETIC FIBERS; DACRON; NYLON THREAD; NYLON; THREADS; *INDUSTRIAL EQUIPMENT; *MACHINES; DESIGN; SPECIFICATIONS;)
GOODYEAR AIRCRAFT CORP., AKRON, OHIO.
AD-274 309 62-3-1 DIV. 14

***MAGNESIUM**

(*ALUMINUM; *MAGNESIUM; *IRON; *SINGLE CRYSTALS; *DEFORMATION; STRESSES; SHEAR STRESSES; PLASTIC FLOW; THEORY; PREPARATION;)
NOTRE DAME U., IND.
AD-274 116 62-3-1 DIV. 25

***MAGNESIUM ALLOYS**

(ALLOYS; *ALUMINUM ALLOYS; *MAGNESIUM ALLOYS; *TITANIUM ALLOYS; *STEEL; *STAINLESS STEEL; *NICKEL ALLOYS;) (PLASTICS; *EPOXY RESINS; *EXPANDED PLASTICS; *ACRYLIC RESINS;) (MECHANICAL PROPERTIES; ELECTRICAL PROPERTIES; PHYSICAL PROPERTIES; ELECTRICAL PROPERTIES; DATA; TABLES; INDEXES;)
REPUBLIC AVIATION CORP., FARMINGDALE, N. Y.
AD-274 289 62-3-1 DIV. 17

***MAGNETIC FIELDS**

(*MAGNETIC FIELDS; GAS FLOW; *SHOCK TUBES; *PLASMA PHYSICS;) (MAGNETIC EFFECTS; SHOCK TUBES; ELECTRICAL PROPERTIES;)
AVCO EVERETT RESEARCH LAB., EVERETT, MASS.
AD-274 094 62-3-1 DIV. 9

(*PLASMA PHYSICS OF COLLISION-FREE IONIZATION; *SHOCK WAVES;) (*MAGNETIC FIELDS; MEASUREMENT; *MAGNETOHYDRODYNAMICS;) (ELECTRONS; TEMPERATURE BASED ON ULTRAVIOLET RADIATION;) (HEAT TRANSFER FROM PLASMA TO SHOCK TUBES (WALLS);)
AVCO EVERETT RESEARCH LAB., EVERETT, MASS.
AD-274 218 62-3-1 DIV. 25

(*ELECTRON GUNS; THEORY; DESIGN; TESTS WITH *ELECTRON BEAMS ACROSS *MAGNETIC FIELDS; *ELECTRIC FIELDS;) (MICROWAVE EQUIPMENT; OPTICAL SYSTEMS;) ELECTRON BEAMS; STABILITY; *SPACE CHARGES; *FOCUSING; ELECTRODES; CATHODES (ELECTRON TUBES); *ELECTRON TUBES; MATHEMATICAL ANALYSIS; DIRECT CURRENT; MEASUREMENT;
MICROWAVE LAB., STANFORD U., CALIF.
AD-274 256 62-3-1 DIV. 8

(*MAGNETOHYDRODYNAMICS; *FLUID FLOW (TWO DIMENSIONAL) IN *MAGNETIC FIELDS;) (VECTOR ANALYSIS; PERTURBATION THEORY; SUBSONIC FLOW; SUPERSONIC FLOW; COMPRESSIBLE FLOW;) NUMERICAL ANALYSIS;
AVCO EVERETT RESEARCH LAB., MASS.
AD-274 287 62-3-1 DIV. 25

***MAGNETIC MATERIALS**

(*MAGNETIC MATERIALS; BARIUM COMPOUNDS; COBALT COMPOUNDS; IRON COMPOUNDS; NICKEL COMPOUNDS; OXIDES; CRYSTALS FOR MICROWAVE FREQUENCY; *PHASE SHIFTERS; *MICROWAVE NETWORKS; ELECTRONIC CIRCUITS; TEST METHODS; X-RAY DIFFRACTION ANALYSIS; TESTS; MEASUREMENT; SYNTHESIS;) (SUPERHIGH FREQUENCY; EXTREMELY HIGH FREQUENCY; K BAND; RESONANCE; ABSORPTION; MICROWAVE EQUIPMENT;) (*FERRITES; FERROMAGNETIC MATERIALS; *METALLIC CRYSTALS;) *BIBLIOGRAPHY; THEORY;
SPERRY MICROWAVE ELECTRONICS CO., CLEARWATER, FLA.
AD-273 984 62-3-1 DIV. 8

***MAGNETIC PINCH**

(PLASMA PHYSICS; *GAS IONIZATION; *MAGNETIC PINCH; ELECTROMAGNETIC FIELDS;) (SHOCK TUBES; ARGON; HYDROGEN; *PLASMA PHYSICS (ELECTROMAGNETIC FIELDS, LOW FREQUENCY;) SCHLIEREN PHOTOGRAPHY;
MAGNETOGASDYNAMICS LAB., MASS. INST. OF TECH., CAMBRIDGE.
AD-274 165 62-3-1 DIV. 25

(*GAS IONIZATION; PLASMA PHYSICS; *MAGNETIC PINCH; IONS; *DIFFUSION; MAGNETIC FIELDS;) FLUID MECHANICS,
MAGNETOGASDYNAMICS LAB., MASS. INST. OF TECH., CAMBRIDGE.
AD-274 166 62-3-1 DIV. 25

***MAGNETIC STORMS**

(IONOSPHERE; ELECTRIC CURRENTS; *IONOSPHERIC DISTURBANCES; *MAGNETIC STORMS; PLASMA PHYSICS;)
RAND CORP., SANTA MONICA, CALIF.
AD-274 267 62-3-1 DIV. 2

***MAGNETOHYDRODYNAMICS**

(*BIBLIOGRAPHY; ENERGY;) (*THERMOELECTRICITY; THERMIONIC EMISSION; PHOTOEMISSION; PHOTOELECTRIC CELLS; *MAGNETOHYDRODYNAMICS; ELECTROCHEMISTRY; FUEL CELLS; PRIMARY BATTERIES; STORAGE BATTERIES; NUCLEAR ENERGY; *SOLAR ENERGY; *POWER SUPPLIES; SOLAR CELLS;)
NAVAL RESEARCH LAB., WASHINGTON, D. C.
AD-274 070 62-3-1 DIV. 7

(*AERODYNAMICS WITH RESPECT TO AIRFOILS IN GAS FLOW SUBJECT TO MAGNETIC FIELDS;) (DRAG; LIFT;) (*MAGNETOHYDRODYNAMICS; GAS FLOW; CONDUCTIVITY;)
RENSSELAER POLYTECHNIC INST., TROY, N. Y.
AD-274 180 62-3-1 DIV. 9

(*PLASMA PHYSICS OF COLLISION-FREE IONIZATION; *SHOCK WAVES;) (*MAGNETIC FIELDS; MEASUREMENT; *MAGNETOHYDRODYNAMICS;) (ELECTRONS; TEMPERATURE BASED ON ULTRAVIOLET RADIATION;) (HEAT TRANSFER FROM PLASMA TO SHOCK TUBES (WALLS);)
AVCO EVERETT RESEARCH LAB., EVERETT, MASS.
AD-274 218 62-3-1 DIV. 25

(*MAGNETOHYDRODYNAMICS; *FLUID FLOW (TWO DIMENSIONAL) IN *MAGNETIC FIELDS;) (VECTOR ANALYSIS; PERTURBATION THEORY; SUBSONIC FLOW; SUPERSONIC FLOW; COMPRESSIBLE FLOW;) NUMERICAL ANALYSIS;
AVCO EVERETT RESEARCH LAB., MASS.
AD-274 287 62-3-1 DIV. 25

(*MAGNETOHYDRODYNAMICS; *FLUID FLOW;) (MAGNETIC FIELDS; VECTOR ANALYSIS; INCOMPRESSIBLE FLOW OR *SUPERSONIC FLOW IN SHOCK TUBES;) (*PERTURBATION THEORY; PARTIAL DIFFERENTIAL EQUATIONS;
AVCO EVERETT RESEARCH LAB., MASS.
AD-274 288 62-3-1 DIV. 25

***MAGNETOMETERS**

(*SATELLITE VEHICLES; SPACE PROBES; INSTRUMENTATION; ELECTRONIC EQUIPMENT; RADIO TRANSMITTERS; DATA TRANSMISSION SYSTEMS; *MAGNETOMETERS; RUBIDIUM; VAPOR PLATING; VAPORS; INSTALLATION;) (*AIRFRAMES; SPIN STABILIZED AMMUNITION; DESIGN; TESTS; MANUFACTURING METHODS;) (COSMIC RAYS; MAGNETIC FIELDS; MEASUREMENT;)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 026 62-3-1 DIV. 12

(*MAGNETOMETERS; TESTS; SENSITIVITY;) (TERRESTRIAL MAGNETISM; PERIODIC VARIATIONS;)
SCHONSTEDT ENGINEERING CO., SILVER SPRING, MD.
AD-274 271 62-3-1 DIV. 30

***MAINTENANCE**

(*BIBLIOGRAPHY; *MAINTENANCE; *HUMAN ENGINEERING;) (*AUTOMATION; MAINTENANCE PERSONNEL; TRAINING; ATTENTION;) (ELECTRONIC EQUIPMENT; COMPUTERS; FLIGHT INSTRUMENTS;) (TIME; COSTS; QUALITY CONTROL;)
RAND CORP., SANTA MONICA, CALIF.
AD-274 035 62-3-1 DIV. 28

***MANGANESE ALLOYS**

(CRYSTAL STRUCTURE) SINGLE CRYSTALS; *MANGANESE ALLOYS; *NICKEL ALLOYS; *PHOSPHORUS ALLOYS; X-RAY DIFFRACTION ANALYSIS; PHASE STUDIES; POWDER ALLOYS; PREPARATION;) (PHOSPHIDES; MANGANESE COMPOUNDS; NICKEL COMPOUNDS;)
UPPSALA U. (SWEDEN).
AD-274 278 62-3-1 DIV. 25

***MANNED**

(*SPACE FLIGHT; *MANNED; *SCIENTIFIC RESEARCH; SPACE MEDICINE; BEHAVIOR; *HUMAN ENGINEERING; STRESS (PHYSIOLOGY); STRESS (PSYCHOLOGY);) (*COMPUTERS; LOGISTICS; COSTS;) (*PERSONNEL; SCIENTIFIC PERSONNEL; ENGINEERING PERSONNEL; TRAINING;)
SPACE ENVIRONMENTAL CONDITIONS; SIMULATION,
CORNELL AERONAUTICAL LAB., INC., BUFFALO, N. Y.
AD-274 053 62-3-1 DIV. 12

***MASS SPECTROMETERS**

(*MASS SPECTROMETERS; DESIGN FOR *PLASMA PHYSICS;) (EXCITATION; IONS; MEASUREMENT; GASES; QUADRUPOLE MOMENTS; THERMOELECTRICITY;) (ELECTRONIC EQUIPMENT; VACUUM SYSTEMS;)
MINNESOTA U., MINNEAPOLIS,
AD-274 249 62-3-1 DIV. 25

***MATERIALS**

(*NEUTRON SPECTROSCOPY; NEUTRONS; ENERGY; MEASUREMENT; ANALYSIS;) (SEMICONDUCTORS; NEUTRON SPECTROMETERS; SODIUM COMPOUNDS; ISOTOPES; IODINE COMPOUNDS; NEUTRON CAPTURE OF GAMMA RAY SPECTROSCOPY;) (QUARTZ CRYSTALS (SPECTROMETERS); ALPHA SPECTRA; ANALYSIS FOR BORON COMPOUNDS;) (IDENTIFICATION OF IMPURITIES IN *ELECTRONICS; *MATERIALS;) RESEARCH REACTORS,
MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
AD-274 320 62-3-1 DIV. 20

(*MATERIALS; METALS; *REFRACTORY MATERIALS; ALLOYS;) (FRACTURE (MECHANICS); STRESSES; DAMPING; STRUCTURES; *WELDING;) (ELECTRONICS; ELECTRONIC SYSTEMS; GUIDANCE;) (SEALS; HYDRAULIC SYSTEMS, HYDRAULIC FLUIDS;) (COATINGS; NIOBIUM; OXIDATION;) (RIVETS; ALUMINUM ALLOYS; CHEMICAL MILLING;) (TITANIUM ALLOYS; BERYLLIUM; IRON; STAINLESS STEEL; PLASTICS;) (SOLAR CELLS; SILICON;)
REPUBLIC AVIATION CORP., FARMINGDALE, N. Y.
AD-274 337 62-3-1 DIV. 14

***MATRIX ALGEBRA**

(*MATRIX ALGEBRA; *COMBINATORIAL ANALYSIS; SEQUENCES;)
RAND CORP., SANTA MONICA, CALIF.
AD-274 181 62-3-1 DIV. 15

(*MATRIX ALGEBRA; *COMBINATORIAL ANALYSIS; SEQUENCES;)
RAND CORP., SANTA MONICA, CALIF.
AD-274 339 62-3-1 DIV. 15

***MEMORY DEVICES**

(*COMPUTER LOGIC; *TRIGGERED GATES; TRANSISTORS; *DIODES; DELAY CIRCUITS;) DIGITAL COMPUTERS; *MEMORY DEVICES; PROGRAMMING,
RCA INDUSTRIAL ELECTRONIC PRODUCTS, CAMDEN, N. J.
AD-274 177 62-3-1 DIV. 30

***MERCURY**

(PHYSICAL PROPERTIES OF *ETHANOLS; *MERCURY IN SPHERES, PROPELLANT TANKS DURING *WEIGHTLESSNESS;) (LIQUID ROCKET PROPELLANTS; SURFACE TENSION; SURFACE PROPERTIES; CONFIGURATION; FLUID MECHANICS;)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 170 62-3-1 DIV. 9

***METABOLIC PRODUCTS**

(*WATER; RECOVERY AND PURIFICATION FROM *METABOLIC PRODUCTS;) (CLOSED-CYCLE ECOLOGICAL SYSTEMS; SPACE FLIGHT; SPACE MEDICINE;) (*URINE; PROCESSING; VAPORIZATION;)
SPACE SCIENCES LAB., GENERAL ELECTRIC CO., PHILADELPHIA, PA.
AD-274 149 62-3-1 DIV. 16

***METAL COATINGS**

(*SUPERCONDUCTORS; THIN FILMS; PRODUCTION; MANUFACTURING METHODS BY *VAPOR PLATING; *METAL COATINGS OF METAL FILMS; LEAD; TIN AND *PLASTIC COATINGS, POLYMERS; SILICONES; ELECTRIC INSULATION;) LOW TEMPERATURE RESEARCH LOW PRESSURE RESEARCH; ELECTRONIC EQUIPMENT; CIRCUITS;
SPACE TECHNOLOGY LABS., INC., LOS ANGELES, CALIF.
AD-274 030 62-3-1 DIV. 8

***METAL FORMING PRESSES**

(*METAL FORMING PRESSES; *EXPLOSIVE FORMING; IMPACT SHOCK; RUBBER; SYNTHETIC RUBBER; VELOCITY; PRESSURE; HYDRAULIC PRESSES; PNEUMATIC SYSTEMS;) (SHEETS; ALUMINUM ALLOYS; STAINLESS STEEL; TESTS; DESIGN; DATA;)
GENERAL DYNAMICS/CONVAIR, SAN DIEGO, CALIF.
AD-274 242 62-3-1 DIV. 26

***METALLIC CRYSTALS**

(*MAGNETIC MATERIALS; BARIUM COMPOUNDS; COBALT COMPOUNDS; IRON COMPOUNDS; NICKEL COMPOUNDS; OXIDES; CRYSTALS FOR MICROWAVE FREQUENCY; *PHASE SHIFTERS; *MICROWAVE NETWORKS; ELECTRONIC CIRCUITS; TEST METHODS; X-RAY DIFFRACTION ANALYSIS; TESTS; MEASUREMENT; SYNTHESIS;) (SUPERHIGH FREQUENCY; EXTREMELY HIGH FREQUENCY; K BAND; RESONANCE; ABSORPTION; MICROWAVE EQUIPMENT;) (*FERRITES; FERROMAGNETIC MATERIALS; *METALLIC CRYSTALS;) *BIBLIOGRAPHY; THEORY;
SPERRY MICROWAVE ELECTRONICS CO., CLEARWATER, FLA.
AD-273 984 62-3-1 DIV. 8

***METALLIC TEXTILES**

(GLIDERS; RE-ENTRY VEHICLES; STRUCTURES; MATERIALS;) (*TEXTILES; *METALLIC TEXTILES; *IRE; NICKEL ALLOYS (RENE 41); COBALT ALLOYS; *SYNTHETIC FIBERS; DACRON; NYLON

THREAD; NYLON; THREADS; *INDUSTRIAL EQUIPMENT; *MACHINES; DESIGN; SPECIFICATIONS.)
GOODYEAR AIRCRAFT CORP., AKRON, OHIO.
AD-274 309 62-3-1 DIV. 14

(*REINFORCING MATERIALS; *GLASS TEXTILES; *CERAMIC FIBERS, *METALLIC TEXTILES; *FIBERS; WIRE; SINGLE CRYSTALS; METALS; CERAMIC MATERIALS; GRAPHITE; PRODUCTION; DRAWING (MACHINE PROCESSING); EXTRUSION; CASTING; GROWTH; MECHANICAL PROPERTIES; PHYSICAL PROPERTIES; BIBLIOGRAPHY.
CLEVITE CORP., CLEVELAND, OHIO.
AD-274 379 62-3-1 DIV. 14

***METALORGANIC COMPOUNDS**

(*METALORGANIC COMPOUNDS; CARBON COMPOUNDS; *SILICON COMPOUNDS; *GERMANIUM COMPOUNDS; *TIN COMPOUNDS; *LEAD COMPOUNDS; PHENYL RADICALS; BENZENES; *LUMINESCENT MATERIALS; PHOSPHORESCENT MATERIALS; *LUMINESCENCE; PHOSPHORESCENCE; FLUORESCENCE; SPECTROGRAPHIC ANALYSIS; ULTRAVIOLET SPECTROSCOPY; ABSORPTION; ULTRAVIOLET RADIATION; EXCITATION; HALF LIFE; PHOSPHORESENT DECAY.) (THEORY; QUANTUM MECHANICS; ELECTRON TRANSITIONS.)
AERONAUTICAL RESEARCH LAB., OFFICE OF AEROSPACE RESEARCH; WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 398 62-3-1 DIV. 25

(ROCKET CASES; COMBUSTION CHAMBER LINERS FOR SOLID ROCKET PROPELLANTS; *THERMAL INSULATION; POLYMERS; *HEAT RESISTANT POLYMERS.) (SYNTHESIS BY COPOLYMERIZATION; VINYL RADICALS; *METALORGANIC COMPOUNDS; *SILICON COMPOUNDS; *TIN COMPOUNDS; *TITANIUM COMPOUNDS; *CHELATE COMPOUNDS; PROCESSING; AGING WITH CATALYSTS.)
HUGHES AIRCRAFT CO., CULVER CITY, CALIF.
AD-274 393 62-3-1 DIV. 27

***METALS**

(*METALS; ZONE MELTING; *GRAINS (METALLURGY); GROWTH; CRYSTAL STRUCTURE; CRYSTALLIZATION; THEORY; MATHEMATICAL ANALYSIS; EQUATIONS.)
ILLINOIS INST. OF TECH., CHICAGO.
AD-273 979 62-3-1 DIV. 17

(*CRYOGENICS; *ADHESIVES; *RESIN ADHESIVES; STAINLESS STEEL (301; 304; 310); ALUMINUM ALLOYS (2014; 2219; 5456); TITANIUM ALLOYS; FRACTURE (MECHANICS); MECHANICAL PROPERTIES.) (SPACE ENVIRONMENTAL CONDITIONS; PNEUMATIC DEVICES; PLASTICS; ELASTOMERS; ADHESION; LUBRICATION; THERMAL EXPANSION; THERMAL INSULATION.) (*HIGH TEMPERATURE RESEARCH; *HEAT RESISTANT ALLOYS; REFRACTORY MATERIALS; STAINLESS STEEL (301); MILL; TITANIUM ALLOYS; REFRACTORY COATINGS; *METALS; *ALLOYS; NIOBIUM ALLOYS (FS 821.) (SPACESHIPS; SATELLITE VEHICLES,)
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
AD-274 211 62-3-1 DIV. 14

***METEOROLOGICAL RADAR**

(PACIFIC OCEAN; *STORMS; CYCLONES; RADAR ANALYSIS; *METEOROLOGICAL RADAR.) (WASHINGTON; METEOROLOGICAL DATA.)
WASHINGTON U., SEATTLE.
AD-274 033 62-3-1 DIV. 2

***MICA**

(*LAMINATES; *REINFORCING MATERIALS; *GLASS; GLASS TEXTILES; *MICA; DISKS; FILMS; PLASTICS; STRUCTURES; MATERIALS.) (PROCESSING; FILAMENT BOUND CONSTRUCTION; CASTING; MOLDING; HYDROSTATIC PRESSURE.) (TESTS; STRESSES; DEFORMATION; MECHANICAL PROPERTIES; ELECTRICAL PROPERTIES; TENSILE PROPERTIES.) (BEAMS; CYLINDRICAL BODIES; ROCKET MOTOR NOZZLES; CONTAINERS; SCREW THREADS; BATTERY COMPARTMENTS.)
NARMCO INDUSTRIES, INC., SAN DIEGO, CALIF.
AD-274 332 62-3-1 DIV. 14

***MICROWAVE AMPLIFIERS**

(*PHASE SHIFTERS; *PARAMETRIC AMPLIFIERS; *MICROWAVE AMPLIFIERS; VERY HIGH FREQUENCY; ULTRA HIGH FREQUENCY; P BAND; L BAND; DESIGN.) (AMPLIFIERS; MODEL TESTS; TRANSISTORS; SEMICONDUCTORS; CRYSTALS; KLYSTRONS; MODULATION; MEASUREMENT.) (*RADIO INTERCEPTION; *RADAR INTERCEPTION; NOISE (RADIO); BROADBAND.)
HRB-SINGER, INC., STATE COLLEGE, PA.
AD-273 959 62-3-1 DIV. 8

(*TRANSISTORS; *TRANSISTOR AMPLIFIERS; GERMANIUM; HIGH FREQUENCY; DESIGN; PROCESSING; TESTS.) (*MICROWAVE NETWORKS; *PACKAGED CIRCUITS; *MICROWAVE OSCILLATORS; *MICROWAVE AMPLIFIERS; MIXER TUBES.) (MICROWAVE EQUIPMENT; TEST EQUIPMENT; SIGNAL-TO-NOISE RATIO; MEASUREMENT; MATHEMATICAL ANALYSIS; ELECTROSTATIC CAPACITANCES; IMPEDANCE; ELECTRICAL PROPERTIES; MECHANICAL PROPERTIES.)
(ALLOYS; GOLD; ALUMINUM.)
HUGHES AIRCRAFT CO., NEWPORT BEACH, CALIF.
AD-274 006 62-3-1 DIV. 8

(*TRAVELING WAVE TUBES; *MIXER TUBES; *MICROWAVE AMPLIFIERS; HELIXES; SIGNAL-TO-NOISE RATIO; NOISE (RADIO); DESIGN; TESTS.) (*PARAMETRIC AMPLIFIERS; ELECTRON GUNS; CATHODES (ELECTRON TUBES); ANODES (ELECTRON TUBES); ELECTRODES; CYCLOTRONS; SPACE CHARGES; ELECTRON BEAMS; MAGNETS; TESTS.) (WAVEGUIDE COUPLERS; COUPLING CIRCUITS; X BAND; L BAND; MICROWAVE OSCILLATORS.)
SPERRY GYROSCOPE CO., GREAT NECK, N. Y.
AD-274 079 62-3-1 DIV. 8

(*TRAVELING WAVE TUBES; *KLYSTRONS; *MICROWAVE AMPLIFIERS; ULTRA HIGH FREQUENCY; HELIXES; COUPLING CIRCUITS; S BAND; STANDING WAVE RATIOS; THEORY.) (AMPLIFIERS; ELECTRON TUBES; *ELECTRON GUNS; CATHODES (ELECTRON TUBES); SPACE CHARGES; NUMERICAL METHODS AND PROCEDURES; MATHEMATICAL ANALYSIS; THEORY.) (MAGNETRONS; ELECTRON BEAMS; PLASMA PHYSICS; ELECTRIC FIELDS; MAGNETIC FIELDS.)
ELECTRON PHYSICS LAB., U. OF MICHIGAN, ANN ARBOR.
AD-274 110 62-3-1 DIV. 8

(*PARAMETRIC AMPLIFIERS; X BAND; K BAND; P BAND; L BAND; S BAND; ULTRA HIGH FREQUENCY; SUPERHIGH FREQUENCY; VERY HIGH FREQUENCY; AIRBORNE.) (*MICROWAVE AMPLIFIERS; BROADBAND; SEMICONDUCTORS, DIODES; SILICON; ARSENIDES; GALLIUM COMPOUNDS.) (*AMPLIFIERS, THIN FILMS; CAVITY RESONATORS; ELECTRIC FIELDS; CRYSTALS; NEGATIVE RESISTANCE CIRCUITS; MICROWAVE OSCILLATORS; SIGNAL-TO-NOISE RATIO.
MOTOROLA, INC., PHOENIX, ARIZ.
AD-274 114 62-3-1 DIV. 8

(*SEMICONDUCTORS; *PARAMETRIC AMPLIFIERS; *MICROWAVE AMPLIFIERS; *DIODES; DESIGN FOR HELIXES; PARAMETRIC AMPLIFIERS; DISTRIBUTED AMPLIFIERS WITH COAXIAL CABLES; MICROWAVE OSCILLATORS; EXTREMELY HIGH FREQUENCY; *FREQUENCY MULTIPLIERS.) (AMPLIFIERS; GERMANIUM; GALLIUM COMPOUNDS; ANTIMONIDES; DESIGN; THEORY; NOISE (RADIO); NOISE (RADAR).) (AMPLIFIERS WITH NEGATIVE RESISTANCE CIRCUITS; TRANSMISSION LINES; HALL EFFECT; SOLID STATE PHYSICS.)
(*FREQUENCY SHIFT CONVERTERS; ULTRA HIGH FREQUENCY; S BAND; ELECTRONIC CIRCUITS; *MICROWAVE EQUIPMENT; NONLINEAR SYSTEMS; PUMPS; THEORY; MATHEMATICAL ANALYSIS.)
DAVID SARNOFF RESEARCH CENTER, PRINCETON, N. J.
AD-274 340 62-3-1 DIV. 8

***MICROWAVE EQUIPMENT**

*ELECTRONICS; *ELECTRONIC CIRCUITS; *SOLID STATE PHYSICS; SEMICONDUCTORS; PARAMETRIC AMPLIFIERS; ELECTRICAL NETWORKS; PULSE AMPLIFIERS; TRANSISTORS; OSCILLATORS; HARMONIC OSCILLATORS; AMPLIFIERS; FEEDBACK AMPLIFIERS; TRANSMISSION LINES; *COMPUTERS; *COMPUTER LOGIC; DIGITAL COMPUTERS; PROGRAMMING; THEORY; MACHINE TRANSLATION; SPECIAL FUNCTIONS; MICROWAVE AMPLIFIERS; *MICROWAVE EQUIPMENT; *PLASMA PHYSICS; WAVEGUIDES; MICROWAVES; PROPAGATION; MAGNETRONS; CYCLOTRONS; NOISE (RADIO); SLOT ANTENNAS; ANTENNAS; *ELECTROMAGNETIC WAVES; CRYSTALS; SELENIUM; LIGHT; PULSE MODULATION; CODING; LASERS; NUCLEAR MAGNETIC RESONANCE; THIN FILMS; GARNET; CONTROL SYSTEMS; *LINEAR SYSTEMS; *NONLINEAR SYSTEMS; SEQUENCES; DELAY LINES; INFORMATIONN THEORY; INFORMATION RETRIEVAL; TELEVISION EQUIPMENT; CIRCUIT BREAKERS; INVERTER CIRCUITS.
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY.
AD-274 101 62-3-1 DIV. 8

(*SEMICONDUCTORS; *PARAMETRIC AMPLIFIERS; *MICROWAVE AMPLIFIERS; *DIODES; DESIGN FOR HELIXES; PARAMETRIC AMPLIFIERS; DISTRIBUTED AMPLIFIERS WITH COAXIAL CABLES; MICROWAVE OSCILLATORS; EXTREMELY HIGH FREQUENCY; *FREQUENCY MULTIPLIERS.) (AMPLIFIERS; GERMANIUM; GALLIUM COMPOUNDS; ANTIMONIDES; DESIGN; THEORY; NOISE (RADIO); NOISE (RADAR).) (AMPLIFIERS WITH NEGATIVE RESISTANCE CIRCUITS; TRANSMISSION LINES; HALL EFFECT; SOLID STATE PHYSICS.)
(*FREQUENCY SHIFT CONVERTERS; ULTRA HIGH FREQUENCY; S BAND; ELECTRONIC CIRCUITS; *MICROWAVE EQUIPMENT; NONLINEAR SYSTEMS; PUMPS; THEORY; MATHEMATICAL ANALYSIS.)
DAVID SARNOFF RESEARCH CENTER, PRINCETON, N. J.
AD-274 340 62-3-1 DIV. 8

***MICROWAVE NETWORKS**

(*MAGNETIC MATERIALS; BARIUM COMPOUNDS; COBALT COMPOUNDS; IRON COMPOUNDS; NICKEL COMPOUNDS; OXIDES; CRYSTALS FOR MICROWAVE FREQUENCY; *PHASE SHIFTERS; *MICROWAVE NETWORKS; ELECTRONIC CIRCUITS; TEST METHODS; X-RAY DIFFRACTION ANALYSIS; TESTS; MEASUREMENT; SYNTHESIS.) (SUPERHIGH FREQUENCY; EXTREMELY HIGH FREQUENCY; K BAND; RESONANCE; ABSORPTION; MICROWAVE EQUIPMENT.) (*FERRITES; FERROMAGNETIC MATERIALS; *METALLIC CRYSTALS.) *BIBLIOGRAPHY; THEORY.
SPERRY MICROWAVE ELECTRONICS CO., CLEARWATER, FLA.
AD-273 984 62-3-1 DIV. 8

(*TRANSISTORS; *TRANSISTOR AMPLIFIERS; GERMANIUM; HIGH FREQUENCY; DESIGN; PROCESSING; TESTS.) (*MICROWAVE NETWORKS; *PACKAGED CIRCUITS; *MICROWAVE OSCILLATORS; *MICROWAVE AMPLIFIERS; MIXER TUBES.) (MICROWAVE EQUIPMENT; TEST EQUIPMENT; SIGNAL-TO-NOISE RATIO; MEASUREMENT; MATHEMATICAL ANALYSIS; ELECTROSTATIC CAPACITANCES; IMPEDANCE; ELECTRICAL PROPERTIES; MECHANICAL PROPERTIES.)
(ALLOYS; GOLD; ALUMINUM.)
HUGHES AIRCRAFT CO., NEWPORT BEACH, CALIF.
AD-274 006 62-3-1 DIV. 8

***MICROWAVE OSCILLATORS**

(*TRANSISTORS; *TRANSISTOR AMPLIFIERS; GERMANIUM; HIGH FREQUENCY; DESIGN; PROCESSING; TESTS.) (*MICROWAVE NETWORKS; *PACKAGED CIRCUITS; *MICROWAVE OSCILLATORS; *MICROWAVE AMPLIFIERS; MIXER TUBES.) (MICROWAVE EQUIPMENT; TEST EQUIPMENT; SIGNAL-TO-NOISE RATIO; MEASUREMENT; MATHEMATICAL ANALYSIS; ELECTROSTATIC CAPACITANCES; IMPEDANCE; ELECTRICAL PROPERTIES; MECHANICAL PROPERTIES.)
(ALLOYS; GOLD; ALUMINUM.)
HUGHES AIRCRAFT CO., NEWPORT BEACH, CALIF.
AD-274 006 62-3-1 DIV. 8

***MICROWAVE PROBES**

(*PLASMA PHYSICS; DENSITY; MEASUREMENT; INSTRUMENTATION; *MICROWAVE PROBES; TEST EQUIPMENT; SPECTROGRAPHIC CAMERAS.) MICROWAVES.
ELECTRICAL ENGINEERING RESEARCH LAB., U. OF ILLINOIS, URBANA.
AD-273 961 62-3-1 DIV. 25

***MICROWAVES**

(*PLASMA PHYSICS; *MICROWAVES; ABSORPTION.) (ELECTRONS; DENSITY.) PARTIAL DIFFERENTIAL EQUATIONS.
MICROWAVE PHYSICS LAB., MOUNTAIN VIEW, CALIF.
AD-274 126 62-3-1 DIV. 25

(*RADIOBIOLOGY; RADIATION INJURIES; LABORATORY ANIMALS; BRAINS; BLOOD; RECOVERY; SURVIVAL.) (*RADIATION EFFECTS OF ULTRA HIGH FREQUENCY; *MICROWAVES; *ULTRAVIOLET RADIATION; X RAYS; GAMMA RAYS; IONIZATION.) DOSE RATE.
ROCHESTER U., N. Y.
AD-274 338 62-3-1 DIV. 16

***MILITARY COMMUNICATIONS**

(*MILITARY COMMUNICATIONS; *OPERATIONS RESEARCH; MILITARY ORGANIZATIONS; EFFECTIVENESS.) (*COMMUNICATION SYSTEMS; MILITARY INTELLIGENCE; SIMULATION; TELEPHONE COMMUNICATION SYSTEMS.)
LABORATORIES FOR RESEARCH AND DEVELOPMENT, FRANKLIN INST., PHILADELPHIA, PA.
AD-274 241 62-3-1 DIV. 5

***MINERAL OILS**

(*GEARS; LUBRICATION; HIGH PRESSURE RESEARCH; HIGH TEMPERATURE RESEARCH; FAILURE (MECHANICS); HARDNESS,) (*LUBRICANTS; *MINERAL OILS; *HYDRAULIC GEAR FLUIDS; OILS; SILICONES; SILICATES; ESTERS; LUBRICANT ADDITIVES; PHOSPHORUS COMPOUNDS; FILMS; VISCOSITY; LOADING.)
SHELL DEVELOPMENT CO., EMERYVILLE, CALIF.
AD-273 959 62-3-1 DIV. 26

***MISSILE LAUNCHERS**

(ANALYSIS OF A *GUIDED MISSILE ON A *MISSILE LAUNCHER.) (INTEGRAL EQUATION OF MOTION ON *FLEXIBLE BEAMS AND GUIDED MISSILE; NUMERICAL ANALYSIS IS DEVELOPED FOR SOLUTION.) (BEAMS; LOADING; DYNAMICS.)
ILLINOIS U., URBANA.
AD-274 209 62-3-1 DIV. 25

***MIXER TUBES**

(*TRAVELING WAVE TUBES; *MIXER TUBES; *MICROWAVE AMPLIFIERS; HELIXES; SIGNAL-TO-NOISE RATIO; NOISE (RADIO); DESIGN; TESTS.) (*PARAMETRIC AMPLIFIERS; ELECTRON GUNS; CATHODES (ELECTRON TUBES); ANODES (ELECTRON TUBES); ELECTRODES; CYCLOTRONS; SPACE CHARGES; ELECTRON BEAMS; MAGNETS; TESTS.) (WAVEGUIDE COUPLERS; COUPLING CIRCUITS; X BAND; L BAND; MICROWAVE OSCILLATORS.)
SPERRY GYROSCOPE CO., GREAT NECK, N. Y.
AD-274 079 62-3-1 DIV. 8

***MODULATORS**

(FREQUENCY MODULATION; *INVERTER CIRCUITS; DESIGN; RECTIFIERS FOR *POWER SUPPLIES; DIRECT CURRENT.) (POWER; *MODULATORS; *SWITCHING CIRCUITS, ELECTRONIC SWITCHES.) (SILICONES; SEMICONDUCTORS; RESISTORS; NONLINEAR SYSTEMS; SOLID STATE PHYSICS; ELECTRONIC CIRCUITS.)
ADVANCED ELECTRONICS CENTER, GENERAL ELECTRIC CO., ITHACA, N. Y.
AD-274 051 62-3-1 DIV. 7

***MOLECULAR STRUCTURE**

(*DECABORANES; *MOLECULAR STRUCTURE; POLARIZATION; ATOMIC ORBITALS; DIPOLE MOMENTS; MATHEMATICAL ANALYSIS.)
BOEING SCIENTIFIC RESEARCH LABS., SEATTLE, WASH.
AD-274 090 62-3-1 DIV. 4

(*ORGANIC COMPOUNDS; MONOCYCLIC COMPOUNDS; POLYCYCLIC COMPOUNDS; INFORMATION THEORY; *CODING; COMPUTERS; *DATA STORAGE SYSTEMS; DOCUMENTATION.) *MOLECULAR STRUCTURE.
AMERICAN CHEMICAL SOCIETY, WAHINGTON: D. C.
AD-274 358 62-3-1 DIV, 32

***MOLECULES**

(*SHEETS AND *CYLINDRICAL BODIES; *DRAG IN A *SUPERSONIC FLOW; *CONTINUUM MECHANICS; *MOLECULES; GAS FLOW; VISCOSITY.) (HEAT TRANSFER; *SUPERAERODYNAMICS; MACH NUMBER.)
INSTITUTE OF ENGINEERING RESEARCH; U. OF CALIF., BERKELEY.
AD-274 389 62-3-1 DIV, 9

***MOLYBDENUM ALLOYS**

(BRITTLE MATERIALS; *REFRACTORY MATERIALS; *TUNGSTEN; *SINGLE CRYSTALS; GROWTH; PREPARATION; PURIFICATION; ZONE MELTING; ELECTRON BOMBARDMENT; THERMIONIC EMISSION.) (CRYSTAL STRUCTURE; DEFORMATION; FRACTURE (MECHANICS); TENSILE PROPERTIES; SHEAR STRESSES; STRESSES; LATTICES; PLASTICITY; PLASTIC FLOW; TRANSITION TEMPERATURE; CRYSTALLIZATION.) (*MOLYBDENUM ALLOYS; *RHENIUM ALLOYS.) ALLOYS; METALS; LOW TEMPERATURE RESEARCH.
GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
AD-274 151 62-3-1 DIV, 17

(SHEETS; *MOLYBDENUM ALLOYS; *TUNGSTEN ALLOYS; NIOBIUM ALLOYS; TITANIUM ALLOYS; ZIRCONIUM ALLOYS; CARBON ALLOYS.) (PROCESSING; MELTING; ELECTRIC ARCS; VACUUM FURNACES; CASTING; EXTRUSION; ROLLING MILLS; HEAT TREATMENT; CRYSTALLIZATION; GRAINS (METALLURGY); HARDNESS; TENSILE PROPERTIES; SURFACE PROPERTIES.)
CLIMAX MOLYBDENUM CO. OF MICHIGAN; DETROIT.
AD-274 206 62-3-1 DIV, 17

***MONITORS**

(*GAMMA COUNTERS; *NEUTRON COUNTERS.) (*MONITORS; PREAMPLIFIERS; GEIGER COUNTERS; TRIGGER CIRCUITS; POWER SUPPLIES.)
CALIFORNIA INST. OF TECH., PASADENA.
AD-274 378 62-3-1 DIV, 20

***MONOCHROMATIC LIGHT**

(LIGHT; *MONOCHROMATIC LIGHT; OPTICS; REFRACTION; THEORY.) (VECTOR ANALYSIS; INTEGRAL EQUATIONS.)
AIR FORCE CAMBRIDGE RESEARCH LABS., BEDFORD, MASS.
AD-273 994 62-3-1 DIV, 25

***NEPTUNIUM COMPOUNDS**

(*COMPLEX COMPOUNDS; *TRANSURANIC ELEMENTS; CHEMICAL PROPERTIES; SEPARATION; PRECIPITATION; *NEPTUNIUM COMPOUNDS; *PLUTONIUM COMPOUNDS; AMERICIUM COMPOUNDS; CURIUM; BERKELIUM; CALIFORNIA.) BIBLIOGRAPHY.
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 119 62-3-1 DIV, 4

***NEUTRON COUNTERS**

(*GAMMA COUNTERS; *NEUTRON COUNTERS.) (*MONITORS; PREAMPLIFIERS; GEIGER COUNTERS; TRIGGER CIRCUITS; POWER SUPPLIES.)
CALIFORNIA INST. OF TECH., PASADENA.
AD-274 378 62-3-1 DIV, 20

***NICKEL ALLOYS**

(CRYSTAL STRUCTURE) SINGLE CRYSTALS; *MANGANESE ALLOYS; *NICKEL ALLOYS; *PHOSPHORUS ALLOYS; X-RAY DIFFRACTION ANALYSIS; PHASE STUDIES; POWDER ALLOYS; PREPARATION.) (PHOSPHIDES; MANGANESE COMPOUNDS; NICKEL COMPOUNDS.)
UPPSALA U. (SWEDEN).
AD-274 278 62-3-1 DIV, 25

(ALLOYS; *ALUMINUM ALLOYS; *MAGNESIUM ALLOYS; *TITANIUM ALLOYS; *STEEL; *STAINLESS STEEL; *NICKEL ALLOYS.) (PLASTICS; *EPOXY RESINS; *EXPANDED PLASTICS; *ACRYLIC RESINS.) (MECHANICAL PROPERTIES; ELECTRICAL PROPERTIES; PHYSICAL PROPERTIES; ELECTRICAL PROPERTIES; DATA; TABLES; INDEXES.)
REPUBLIC AVIATION CORP., FARMINGDALE, N. Y.
AD-274 289 62-3-1 DIV, 17

***NITRIDES**

(*CERAMIC MATERIALS; *GRAPHITE; THERMAL RADIATION; BLACKBODY RADIATION; ABSORPTION; HEAT TRANSFER FROM SURFACES.) (*CARBIDES OF SILICON COMPOUNDS; TANTALUM COMPOUNDS; TUNGSTEN COMPOUNDS; ZIRCONIUM COMPOUNDS; NICKEL ALLOYED WITH TITANIUM COMPOUNDS.) (*NITRIDES OF BORON COMPOUNDS.) (*OXIDES OF ALUMINUM COMPOUNDS; BERYLLIUM COMPOUNDS; MAGNESIUM COMPOUNDS; ZIRCONIUM COMPOUNDS.) (*SILICIDES OF MOLYBDENUM COMPOUNDS.) DATA; TABLES.
DEFENSE METALS INFORMATION CENTER; COLUMBUS, OHIO.
AD-274 148 62-3-1 DIV, 14

***NOISE**

(*BIBLIOGRAPHY; *SOUND; *ACOUSTICS; AERODYNAMICS; HYDRODYNAMICS; FLUID MECHANICS.) (*NOISE; JET ACOUSTIC OSCILLATIONS; JET ENGINE NOISE; JET PLANE NOISE; PROPELLER NOISE.) (TURBULENCE; RESONANCE; SHOCK WAVES; SOUND TRANSMISSION.)
CALIFORNIA U., LOS ANGELES; CALIF.
AD-274 208 62-3-1 DIV, 25

***NOISE (RADIO)**

(*CRYSTAL OSCILLATORS; PHASE MODULATION; FREQUENCY MODULATION; *NOISE (RADIO).) (OSCILLATORS; RADIOFREQUENCY FILTERS; STABILITY; FREQUENCY ANALYZERS; NOISE ANALYZERS.) (PHASE STUDIES; CORRELATION TECHNIQUES.)
NEW YORK U. COLL. OF ENGINEERING, N. Y.
AD-274 115 62-3-1 DIV, 8

(*DIODES; INTERMETALLIC COMPOUNDS; *GALLIUM COMPOUNDS; *ARSENIDES; *PHOSPHIDES; *NOISE (RADIO); MEASUREMENT.) (CRYSTALS; GROWTH; METALLIC COMPOUNDS; VAPORS; TRANSPORT PROPERTIES; CHEMICAL IMPURITIES; LOW TEMPERATURE RESEARCH.) (ELECTRIC INSULATION; CONDUCTIVITY; SPACE CHARGES; TESTS.) (GOLD ALLOYS; ANTIMONY ALLOYS; GERMANIUM ALLOYS; TIN ALLOYS; SILVER ALLOYS; TELLURIUM ALLOYS.)
GENERAL ELECTRIC CO., SYRACUSE, N. Y.
AD-274 390 62-3-1 DIV, 8

***NONLINEAR SYSTEMS**

(*CYLINDRICAL BODIES; THICKNESS; *ELASTIC SHELLS; STRESSES; PRESSURE.) (*PERTURBATION THEORY; *NONLINEAR SYSTEMS; RELIABILITY.)
COLUMBIA U., NEW YORK.
AD-274 045 62-3-1 DIV, 25

*ELECTRONICS, *ELECTRONIC CIRCUITS; *SOLID STATE PHYSICS; SEMICONDUCTORS; PARAMETRIC AMPLIFIERS; ELECTRICAL NETWORKS; PULSE AMPLIFIERS; TRANSISTORS; OSCILLATORS; HARMONIC OSCILLATORS; AMPLIFIERS; FEEDBACK AMPLIFIERS; TRANSMISSION LINES; *COMPUTERS; *COMPUTER LOGIC; DIGITAL COMPUTERS; PROGRAMMING; THEORY; MACHINE TRANSLATION; SPECIAL FUNCTIONS; MICROWAVE AMPLIFIERS; *MICROWAVE EQUIPMENT; *PLASMA PHYSICS; WAVEGUIDES; MICROWAVES; PROPAGATION; MAGNETRONS; CYCLOTRONS; NOISE (RADIO); SLOT ANTENNAS; ANTENNAS; *ELECTROMAGNETIC WAVES; CRYSTALS; SELENIUM; LIGHT; PULSE MODULATION; CODING; LASERS; NUCLEAR MAGNETIC RESONANCE; THIN FILMS; GARNET; CONTROL SYSTEMS; *LINEAR SYSTEMS; *NONLINEAR SYSTEMS; SEQUENCES; DELAY LINES; INFORMATIONN THEORY; INFORMATION RETRIEVAL; TELEVISION EQUIPMENT; CIRCUIT BREAKERS; INVERTER CIRCUITS.
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY.
AD-274 101 62-3-1 DIV, 8

***NUCLEAR EXPLOSIONS**

(DETERMINATION OF PRESSURE; *BLAST IN TUNNELS RESULTING FROM EXTERIOR *UNDERGROUND STRUCTURES; *NUCLEAR EXPLOSIONS.) (ATTENUATION; PROPAGATION; REFLECTION OF SHOCK WAVES IN TUNNELS.) (BLAST; SHIELDING.) (*SHOCK TUBES FOR TESTING; BLAST IN TUNNELS.)
BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
AD-274 228 62-3-1 DIV, 22

(*UNDERGROUND STRUCTURES; SOILS; AIR BLAST; LOAD DISTRIBUTION; *THERMONUCLEAR EXPERIMENTS; MODEL TESTS; DYNAMICS; SIMULATION; MATHEMATICAL ANALYSIS.) (UNDERGROUND STRUCTURES; *NUCLEAR EXPLOSIONS; BLAST; PRESSURE; *SHOCK TUBES; STRESSES; STATISTICAL ANALYSIS; THEORY.) (PROPAGATION AND ATTENUATION OF *SHOCK WAVES; DAMPING.)
AMERICAN MACHINE AND FOUNDRY CO., NILES, ILL.
AD-274 296 62-3-1 DIV, 13

(*NUCLEAR EXPLOSIONS; TEST FACILITIES.) (NUCLEAR EXPLOSIONS; *SEISMIC WAVES; MEASUREMENT; INSTRUMENTATION.) (GAGES; STRESS GAGES; STRAIN GAGES; ACCELEROMETERS; VELOCITY GAGES; VIBRATION PICKUPS; SEISMOGRAPHS.) (CRATERING; MEASUREMENT.)
STANFORD RESEARCH INST., MENLO PARK, CALIF.
AD-274 341 62-3-1 DIV, 30

***NUCLEAR POWER PLANTS**

(*GENERATORS; AUXILIARY POWER PLANTS; *THERMOELECTRICITY; *ISOTOPES; HEAT TRANSFER; HEAT EXCHANGERS; COOLING; MANUFACTURING METHODS.) (POWER PLANTS; POWER SUPPLIES; *ELECTRIC POWER PRODUCTION; *NUCLEAR POWER PLANTS; THERMAL CONDUCTIVITY; THERMOCOUPLES; IMPEDANCE MATCHING; TESTS.)
WESTINGHOUSE ELECTRIC CORP., CHESWICK, PA.
AD-274 280 62-3-1 DIV, 7

***NUMERICAL ANALYSIS**

(*AERODYNAMIC CONFIGURATIONS; *LAMINAR BOUNDARY LAYER; *COMPRESSIBLE FLOW; SUBSONIC FLOW; SUPERSONIC FLOW; *HYPERSONIC FLOW; VISCOSITY.) (*BOUNDARY LAYER; *EQUATIONS; *NUMERICAL ANALYSIS; *DIFFERENTIAL EQUATIONS; *DIFFERENCE EQUATIONS; *PARTIAL DIFFERENTIAL EQUATIONS.) (SHEETS (FLAT PLATES); SHEAR STRESSES; HEAT TRANSFER; STABILITY; SHOCK WAVES.)
STANFORD U., CALIF.
AD-273 983 62-3-1 DIV, 9

(*TOPOLOGY; *LINEAR PROGRAMMING; *ALGEBRA; INTEGRALS; *INEQUALITIES; DIFFERENTIAL EQUATIONS; GEOMETRY; SEQUENCES.) *NUMERICAL ANALYSIS.
NORTHWESTERN TECHNOLOGICAL INST., EVANSTON; ILL.
AD-274 238 62-3-1 DIV, 15

***OPERATIONS RESEARCH**

(*OPERATIONS RESEARCH; MATHEMATICAL ANALYSIS.) (LINEAR PROGRAMMING; INFORMATION THEORY; GAMES THEORY; STATISTICAL ANALYSIS; STATISTICAL PROCESSES; NUMERICAL METHODS AND PROCEDURES; MATHEMATICAL LOGIC; NONLINEAR SYSTEMS; PROGRAMMING; THEORY; ALGEBRA.)
QUARTERMASTER CORPS; WASHINGTON, D. C.
AD-274 210 62-3-1 DIV, 15

(*MILITARY COMMUNICATIONS; *OPERATIONS RESEARCH; MILITARY ORGANIZATIONS; EFFECTIVENESS.) (*COMMUNICATION SYSTEMS; MILITARY INTELLIGENCE; SIMULATION; TELEPHONE COMMUNICATION SYSTEMS.)
LABORATORIES FOR RESEARCH AND DEVELOPMENT, FRANKLIN INST., PHILADELPHIA, PA.
AD-274 241 62-3-1 DIV, 5

***OPTICS**

(*SEMICONDUCTORS; ELECTRICAL PROPERTIES; *OPTICS.) (MAGNETIC PROPERTIES; INFRARED RADIATION; ABSORPTION.) (PARAMETRIC RESONANCE; SILICON.) (GERMANIUM; THERMAL CONDUCTIVITY, MATERIALS.)
PURDUE RESEARCH FOUNDATION; LAFAYETTE, IND.
AD-273 975 62-3-1 DIV, 25

***ORGANIC COMPOUNDS**

(*ORGANIC COMPOUNDS; MONOCYCLIC COMPOUNDS; POLYCYCLIC COMPOUNDS; INFORMATION THEORY; *CODING; COMPUTERS; *DATA STORAGE SYSTEMS; DOCUMENTATION.) *MOLECULAR STRUCTURE.
AMERICAN CHEMICAL SOCIETY, WAHINGTON: D. C.
AD-274 358 62-3-1 DIV, 32

***OSCILLATORS**

(*SEMICONDUCTORS; *DIODES; *OSCILLATORS; *RADIOFREQUENCY OSCILLATIONS; THEORY; MATHEMATICAL ANALYSIS; NON-LINEAR DIFFERENTIAL EQUATIONS.)
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY.
AD-274 236 62-3-1 DIV, 8

***OXIDES**

(*CERAMIC MATERIALS; *GRAPHITE; THERMAL RADIATION; BLACKBODY RADIATION; ABSORPTION; HEAT TRANSFER FROM SURFACES.) (*CARBIDES OF SILICON COMPOUNDS; TANTALUM COMPOUNDS; TUNGSTEN COMPOUNDS; ZIRCONIUM COMPOUNDS; NICKEL ALLOYED WITH TITANIUM COMPOUNDS.) (*NITRIDES OF BORON COMPOUNDS.) (*OXIDES OF ALUMINUM COMPOUNDS; BERYLLIUM COMPOUNDS; MAGNESIUM COMPOUNDS; ZIRCONIUM COMPOUNDS.) (*SILICIDES OF MOLYBDENUM COMPOUNDS.) DATA; TABLES.
DEFENSE METALS INFORMATION CENTER; COLUMBUS, OHIO.
AD-274 148 62-3-1 DIV, 14

*FLUORIDES; *BORON COMPOUNDS; *OXIDES; LABELED SUBSTANCES; BORON; ISOTOPES; SYNTHESIS; CHEMICAL REACTIONS; DISPROPORTIONATION; DECOMPOSITION; THERMOCHEMISTRY; HEAT OF REACTION; HEAT OF FORMATION; ENTROPY; REACTION KINETICS; INFRARED SPECTROSCOPY; LOW TEMPERATURE RESEARCH; HIGH TEMPERATURE RESEARCH.
HUGHES TOOL CO., CULVER CITY; CALIF.
AD-274 243 62-3-1 DIV, 4

***OXYGEN ELECTRODES**

(*FUEL CELLS; *ELECTROLYTIC CELLS; FUELS; HYDROCARBONS; ELECTRODES; *OXYGEN ELECTRODES; HYDROGEN ELECTRODES; ION EXCHANGE MEMBRANES; *CATALYSTS; PLATINUM; CHEMICAL REACTIONS; OXIDATION-REDUCTION REACTIONS; ELECTROCHEMISTRY; POLARIZATION; THERMODYNAMICS.) HYDROGEN; OXYGEN; LOW TEMPERATURE RESEARCH.
GENERAL ELECTRIC CO., LYNN; MASS.
AD-273 971 62-3-1 DIV, 7

***PACKAGED CIRCUITS**

(*TRANSISTORS; *TRANSISTOR AMPLIFIERS; GERMANIUM; HIGH FREQUENCY; DESIGN; PROCESSING; TESTS.) (*MICROWAVE NETWORKS; *PACKAGED CIRCUITS; *MICROWAVE OSCILLATORS; *MICROWAVE AMPLIFIERS; MIXER TUBES.) (MICROWAVE EQUIPMENT; TEST EQUIPMENT; SIGNAL-TO-NOISE RATIO; MEASUREMENT; MATHEMATICAL ANALYSIS; ELECTROSTATIC CAPACITANCES; IMPEDANCE; ELECTRICAL PROPERTIES; MECHANICAL PROPERTIES.) (ALLOYS; GOLD; ALUMINUM.)
HUGHES AIRCRAFT CO., NEWPORT BEACH, CALIF.
AD-274 006 62-3-1 DIV. 8

***PARAMAGNETIC RESONANCE**

(*PARAMAGNETIC RESONANCE; IONS; RARE EARTHS; CRYSTALS; CALCIUM COMPOUNDS; FLUORIDES; *SPECTROGRAPHIC ANALYSIS.)
HEBREW U. (ISRAEL).
AD-274 000 62-3-1 DIV. 25

***PARAMETRIC AMPLIFIERS**

(*PHASE SHIFTERS; *PARAMETRIC AMPLIFIERS; *MICROWAVE AMPLIFIERS; VERY HIGH FREQUENCY; ULTRA HIGH FREQUENCY; P BAND; L BAND; DESIGN.) (AMPLIFIERS; MODEL TESTS; TRANSISTORS; SEMICONDUCTORS; CRYSTALS; KLYSTRONS; MODULATION; MEASUREMENT.) (*RADIO INTERCEPTION; *RADAR INTERCEPTION; NOISE (RADIO); BROADBAND.)
HRB-SINGER, INC., STATE COLLEGE, PA.
AD-273 939 62-3-1 DIV. 8

(*TRAVELING WAVE TUBES; *MIXER TUBES; *MICROWAVE AMPLIFIERS; HELIXES; SIGNAL-TO-NOISE RATIO; NOISE (RADIO); DESIGN; TESTS.) (*PARAMETRIC AMPLIFIERS; ELECTRON GUNS; CATHODES (ELECTRON TUBES); ANODES (ELECTRON TUBES); ELECTRODES; CYCLOTRONS; SPACE CHARGES; ELECTRON BEAMS; MAGNETS; TESTS.) (WAVEGUIDE COUPLERS; COUPLING CIRCUITS; X BAND; L BAND; MICROWAVE OSCILLATORS.)
SPERRY GYROSCOPE CO., GREAT NECK, N. Y.
AD-274 079 62-3-1 DIV. 8

(*PARAMETRIC AMPLIFIERS; X BAND; K BAND; P BAND; L BAND; S BAND; ULTRA HIGH FREQUENCY; SUPERHIGH FREQUENCY; VERY HIGH FREQUENCY; AIRBORNE.) (*MICROWAVE AMPLIFIERS; BROADBAND; SEMICONDUCTORS; DIODES; SILICON; ARSENIDES; GALLIUM COMPOUNDS.) (*AMPLIFIERS; THIN FILMS; CAVITY RESONATORS; ELECTRIC FIELDS; CRYSTALS; NEGATIVE RESISTANCE CIRCUITS; MICROWAVE OSCILLATORS; SIGNAL-TO-NOISE RATIO; MOTOROLA, INC., PHOENIX, ARIZ.
AD-274 114 62-3-1 DIV. 8

(*SEMICONDUCTORS; *PARAMETRIC AMPLIFIERS; *MICROWAVE AMPLIFIERS; *DIODES; DESIGN FOR HELIXES; PARAMETRIC AMPLIFIERS; DISTRIBUTED AMPLIFIERS WITH COAXIAL CABLES; MICROWAVE OSCILLATORS; EXTREMELY HIGH FREQUENCY; *FREQUENCY MULTIPLIERS.) (AMPLIFIERS; GERMANIUM; GALLIUM COMPOUNDS; ANTIMONIDES; DESIGN; THEORY; NOISE (RADIO); NOISE (RADAR).) (AMPLIFIERS WITH NEGATIVE RESISTANCE CIRCUITS; TRANSMISSION LINES; HALL EFFECT; SOLID STATE PHYSICS.) (*FREQUENCY SHIFT CONVERTERS; ULTRA HIGH FREQUENCY; S BAND; ELECTRONIC CIRCUITS; *MICROWAVE EQUIPMENT; NONLINEAR SYSTEMS; PUMPS; THEORY; MATHEMATICAL ANALYSIS.)
DAVID SARNOFF RESEARCH CENTER, PRINCETON, N. J.
AD-274 340 62-3-1 DIV. 8

***PARTIAL DIFFERENTIAL EQUATIONS**

(*AERODYNAMIC CONFIGURATIONS; *LAMINAR BOUNDARY LAYER; *COMPRESSIBLE FLOW; SUBSONIC FLOW; SUPERSONIC FLOW; *HYPERSONIC FLOW; VISCOSITY.) (*BOUNDARY LAYER; *EQUATIONS; *NUMERICAL ANALYSIS; *DIFFERENTIAL EQUATIONS; *DIFFERENCE EQUATIONS; *PARTIAL DIFFERENTIAL EQUATIONS.) (SHEETS (FLAT PLATES); SHEAR STRESSES; HEAT TRANSFER; STABILITY; SHOCK WAVES.)
STANFORD U., CALIF.
AD-273 983 62-3-1 DIV. 9

(*ELECTROMAGNETIC WAVES; PROPAGATION; WAVEGUIDES; MAGNETIC FIELDS; ELECTRIC CURRENTS.) (*PARTIAL DIFFERENTIAL EQUATIONS; *GREEN'S FUNCTION.) (PLASMA PHYSICS; MATHEMATICAL ANALYSIS; THESES.)
RADIATION LAB., U. OF MICHIGAN, ANN ARBOR.
AD-274 013 62-3-1 DIV. 25

(*ERRORS; ESTIMATION OF A FINITE DIFFERENCE ANALOGUE OF *GREEN'S FUNCTION FOR ELLIPTIC EQUATIONS; *PARTIAL DIFFERENTIAL EQUATIONS.) (OPERATORS (MATHEMATICS); REAL NUMBERS; *DIFFERENCE EQUATIONS.)
INSTITUTE FOR FLUID DYNAMICS AND APPLIED MATHEMATICS, U. OF MARYLAND, COLLEGE PARK.
AD-274 315 62-3-1 DIV. 19

(*PARTIAL DIFFERENTIAL EQUATIONS AND *POTENTIAL THEORY.) (INTEGRAL EQUATIONS; REAL VARIABLES; OPERATORS (MATHEMATICS); TAYLOR'S SERIES; SPECIAL FUNCTIONS.)
INSTITUTE FOR FLUID DYNAMICS AND APPLIED MATHEMATICS, U. OF MARYLAND, COLLEGE PARK.
AD-274 316 62-3-1 DIV. 19

***PARTICLES**

(*GUIDED MISSILES; EXHAUST GASES OR *CONDENSATION TRAILS OF *LIGHT AND *LUMINESCENCE WITH RESPECT TO VELOCITY AND DISTANCE OF *PARTICLES EJECTED IN *UPPER ATMOSPHERE.) (AERODYNAMICS; *DRAG; GRAVITY; DIFFERENTIAL EQUATIONS; INTEGRATION; TABLES.)
GEOPHYSICS CORP. OF AMERICA, BEDFORD, MASS.
AD-273 972 62-3-1 DIV. 25

(*ELECTRIC FIELDS PHENOMENA ASSOCIATED WITH *AEROSOLS, ELECTRONS, *PARTICLES.) (*DROPS; EVAPORATION; VOLTAGE; WATER; SURFACE TENSION; ELECTRICAL PROPERTIES; ELECTROSTATIC PRECIPITATION.) (SPRAY NOZZLES; ATOMIZATION; SCATTERING.)
LITTLE, ARTHUR D., INC., CAMBRIDGE, MASS.
AD-274 247 62-3-1 DIV. 25

(REDUCTION OF *CLOUDS BY *ARTIFICIAL PRECIPITATION.) (CARBON; *PARTICLES FOR SEEDING.) (LIGHT; SCATTERING; ABSORPTION.)
ARMY SIGNAL RESEARCH AND DEVELOPMENT LAB., FORT MONMOUTH, N. J.
AD-274 360 62-3-1 DIV. 2

***PARTICULATE FILTERS**

(*ANTIAIRCRAFT DEFENSE SYSTEMS; *SHELTERS; *PARTICLE FILTERS; *RADAR TRAILERS; PORTABLE SHELTERS; AIR CONDITIONING EQUIPMENT; SAFETY DEVICES; PNEUMATIC DEVICES; TRAILERS; VEHICLES; INSTALLATION; DESIGN.) (AEROSOLS; BIOLOGICAL WARFARE; CHEMICAL WARFARE; RADIOLOGICAL WARFARE.)
HUGHES AIRCRAFT CO., FULLERTON, CALIF.
AD-274 245 62-3-1 DIV. 3

***PERSONNEL**

(*SPACE FLIGHT; *MANNED; *SCIENTIFIC RESEARCH; SPACE MEDICINE; BEHAVIOR; *HUMAN ENGINEERING; STRESS (PHYSIOLOGY); STRESS (PSYCHOLOGY).) (*COMPUTERS; LOGISTICS; COSTS.) (*PERSONNEL, SCIENTIFIC PERSONNEL; ENGINEERING PERSONNEL; TRAINING.)
SPACE ENVIRONMENTAL CONDITIONS; SIMULATION.
CORNELL AERONAUTICAL LAB., INC., BUFFALO, N. Y.
AD-274 053 62-3-1 DIV. 12

***PERTURBATION THEORY**

(*CYLINDRICAL BODIES; THICKNESS; *ELASTIC SHELLS; STRESSES; PRESSURE.) (*PERTURBATION THEORY; *NONLINEAR SYSTEMS; RELIABILITY.)
COLUMBIA U., NEW YORK.
AD-274 043 62-3-1 DIV. 25

(*MAGNETOHYDRODYNAMICS; *FLUID FLOW.) (MAGNETIC FIELDS; VECTOR ANALYSIS; INCOMPRESSIBLE FLOW OR *SUPERSONIC FLOW IN SHOCK TUBES.) (*PERTURBATION THEORY; PARTIAL DIFFERENTIAL EQUATIONS.
AVCO EVERETT RESEARCH LAB., MASS.
AD-274 288 62-3-1 DIV. 25

***PHASE SHIFTERS**

(*PHASE SHIFTERS; *PARAMETRIC AMPLIFIERS; *MICROWAVE AMPLIFIERS; VERY HIGH FREQUENCY; ULTRA HIGH FREQUENCY; P BAND; L BAND; DESIGN.) (AMPLIFIERS; MODEL TESTS; TRANSISTORS; SEMICONDUCTORS; CRYSTALS; KLYSTRONS; MODULATION; MEASUREMENT.) (*RADIO INTERCEPTION; *RADAR INTERCEPTION; NOISE (RADIO); BROADBAND.)
HRB-SINGER, INC., STATE COLLEGE, PA.
AD-273 939 62-3-1 DIV. 8

(*MAGNETIC MATERIALS; BARIUM COMPOUNDS; COBALT COMPOUNDS; IRON COMPOUNDS; NICKEL COMPOUNDS; OXIDES; CRYSTALS FOR MICROWAVE FREQUENCY; *PHASE SHIFTERS; *MICROWAVE NETWORKS; ELECTRONIC CIRCUITS; TEST METHODS; X-RAY DIFFRACTION ANALYSIS; TESTS; MEASUREMENT; SYNTHESIS.) (SUPERHIGH FREQUENCY; EXTREMELY HIGH FREQUENCY; K BAND; RESONANCE; ABSORPTION; MICROWAVE EQUIPMENT.) (*FERRITES; FERROMAGNETIC MATERIALS; *METALLIC CRYSTALS.)
*BIBLIOGRAPHY; THEORY.
SPERRY MICROWAVE ELECTRONICS CO., CLEARWATER, FLA.
AD-273 984 62-3-1 DIV. 8

(TEST SETS; TEST EQUIPMENT; TLST METHODS; *TEST FACILITIES, MILITARY EQUIPMENT; *ELECTRONIC EQUIPMENT; INSTRUMENTATION; DESIGN.) (*CIRCUIT TESTERS, PRINTED CIRCUITS; *ELECTRONIC CIRCUITS; TUNED AMPLIFIERS; PREAMPLIFIERS; SIGNAL-TO-NOISE RATIO; TEST EQUIPMENT; TESTS.) (FIELD WIRE COMMUNICATION SYSTEMS; SIDEBANDS; SIGNAL GENERATORS; *PHASE SHIFTERS; BROADBAND; MODULATORS; HALL EFFECT.) ELECTRICAL PROPERTIES; DETERMINATION.
ARMOUR RESEARCH FOUNDATION, CHICAGO, ILL.
AD-274 289 62-3-1 DIV. 30

***PHONONS**

(*PHONONS; ELECTRONS; METALS; IONS; CONDUCTIVITY; LEAD; SODIUM; *RARE EARTHS; *SPECTROGRAPHIC ANALYSIS.)
CALIFORNIA U., LA JOLLA.
AD-273 995 62-3-1 DIV. 25

***PHOSPHIDES**

(*DIODES; INTERMETALLIC COMPOUNDS; *GALLIUM COMPOUNDS; *ARSENIDES; *PHOSPHIDES; *NOISE (RADIO); MEASUREMENT.) (CRYSTALS; GROWTH; METALLIC COMPOUNDS; VAPORS; TRANSPORT PROPERTIES; CHEMICAL IMPURITIES; LOW TEMPERATURE RESEARCH.) (ELECTRIC INSULATION; CONDUCTIVITY; SPACE CHARGES; TESTS.) (GOLD ALLOYS; ANTIMONY ALLOYS; GERMANIUM ALLOYS; TIN ALLOYS; SILVER ALLOYS; TELLURIUM ALLOYS.)
GENERAL ELECTRIC CO., SYRACUSE, N. Y.
AD-274 390 62-3-1 DIV. 8

***PHOSPHORS**

(*PHOSPHORS; *ZINC COMPOUNDS; *SULFIDES; POWDERS; *LUMINESCENT MATERIALS; *LUMINESCENCE; *PHOTOEMISSION; EXCITATION; VOLTAGE; SOLID STATE PHYSICS; THEORY.)
DIELECTRICS.
NATIONAL ELECTROTECHNICAL INST. (ITALY).
AD-273 963 62-3-1 DIV. 25

***PHOSPHORUS ALLOYS**

(CRYSTAL STRUCTURE) SINGLE CRYSTALS; *MANGANESE ALLOYS; *NICKEL ALLOYS; *PHOSPHORUS ALLOYS; X-RAY DIFFRACTION ANALYSIS; PHASE STUDIES; POWDER ALLOYS; PREPARATION.) (PHOSPHIDES; MANGANESE COMPOUNDS; NICKEL COMPOUNDS.)
UPPSALA U. (SWEDEN).
AD-274 278 62-3-1 DIV. 25

***PHOTOCONDUCTIVITY**

(SOLID STATE PHYSICS; *SOLAR CELLS; *GENERATORS; DESIGN.) (*PHOTOELECTRIC CELLS; METALS AND *SEMICONDUCTORS; CADMIUM COMPOUNDS; SULFIDES; *PHOTOCONDUCTIVITY; *ELECTRIC POWER PRODUCTION.)
GIANNINI CONTROLS CORP., PASADENA, CALIF.
AD-273 974 62-3-1 DIV. 7

***PHOTOELECTRIC CELLS**

(SOLID STATE PHYSICS; *SOLAR CELLS; *GENERATORS; DESIGN.) (*PHOTOELECTRIC CELLS; METALS AND *SEMICONDUCTORS; CADMIUM COMPOUNDS; SULFIDES; *PHOTOCONDUCTIVITY; *ELECTRIC POWER PRODUCTION.)
GIANNINI CONTROLS CORP., PASADENA, CALIF.
AD-273 974 62-3-1 DIV. 7

***PHOTOELECTRIC EFFECT**

(*IONOSPHERE; *IONS; ELECTRONS; *PHOTOELECTRIC EFFECT; ULTRAVIOLET RADIATION; OXYGEN; NITROGEN; NITROGEN COMPOUNDS; OXIDES.)
AIR FORCE CAMBRIDGE RESEARCH LABS., BEDFORD, MASS.
AD-273 999 62-3-1 DIV. 2

(LIGHT; AMPLIFIERS; *RESEARCH PROGRAM ADMINISTRATION.) (*PHOTOELECTRIC EFFECT; PHOTOELECTRIC TRANSDUCERS.) PHOTONS.
OFFICE OF AEROSPACE RESEARCH, WASHINGTON, D. C.
AD-274 028 62-3-1 DIV. 30

***PHOTOEMISSION**

(*PHOSPHORS; *ZINC COMPOUNDS; *SULFIDES; POWDERS; *LUMINESCENT MATERIALS; *LUMINESCENCE; *PHOTOEMISSION; EXCITATION; VOLTAGE; SOLID STATE PHYSICS; THEORY.)
DIELECTRICS.
NATIONAL ELECTROTECHNICAL INST. (ITALY).
AD-273 963 62-3-1 DIV. 25

***PHOTOGRAPHIC EQUIPMENT**

(*PHOTOGRAPHIC EQUIPMENT; PHOTOGRAPHIC ENLARGERS; FILM PROJECTORS; PRINTING; DESIGN.) (AERIAL PHOTOGRAPHY; MAPPING.)
FAIRAND OPTICAL CO., INC., NEW YORK.
AD-274 388 62-3-1 DIV. 24

***PHOTOGRAPHIC INTELLIGENCE**

*AERIAL PHOTOGRAPHY; SIMULATION; TEST METHODS FOR TESTS OF EFFECTIVENESS OF COLORS IN *COLOR PHOTOGRAPHY; DETECTION; SURFACE TARGETS; *PHOTOGRAPHIC INTELLIGENCE.
DUNLAP AND ASSOCIATES, INC., SANTA MONICA, CALIF.
AD-274 149 62-3-1 DIV. 24

***PHOTOLYSIS**

(MIXTURES; *HYDROCARBONS; *GLASS; *LOW TEMPERATURE RESEARCH; FREEZING; PHYSICAL PROPERTIES; VISCOSITY; MELTING.) (PENTANES; HEXANES; CYCLOHEXANES.) (ALKYL RADICALS; *SULFIDES; *THIOLS; *IODINE; ETHYL RADICALS; HYDROGEN COMPOUNDS; *IODIDES; ORGANIC SOLVENTS; HYDROCARBONS; *PHOTOLYSIS; PHOTOCHEMICAL REACTIONS.)
LUND U. (SWEDEN).
AD-274 160 62-3-1 DIV. 4

***PHOTOSYNTHESIS**

(*PHOTOSYNTHESIS; SIMULATION;) (*CHLOROPHYLLS; BIOCHEMISTRY;)
ARMOUR RESEARCH FOUNDATION; CHICAGO, ILL.
AD-274 038 62-3-1 DIV. 16

***PHOTOTUBES**

(*ELECTRONICS; *TEXTBOOKS; USSR;) (ELECTRON TUBES; AMPLIFIERS; RADIO RECEIVERS; RADIO TRANSMITTERS;) (ELECTRON TUBES; SUPER-HIGH FREQUENCY;) ELECTRONS; THEORY; *ELECTRON OPTICS; THERMIONIC EMISSION; PHOTOEMISSION; *CATHODES; OXIDE CATHODES; *DIODES; *TRIODES; TETRODES; PENTODES; *ELECTRON TUBES; FREQUENCY CONVERTERS; *SEMICONDUCTORS; *CATHODE RAY TUBES; KLYSTRONS; MAGNETRONS; TRAVELING WAVE TUBES; *PHOTOTUBES; PHOTOMULTIPLIERS; X RAYS; ELECTRON TUBES.
FOREIGN TECH. DIV.; AIR FORCE SYSTEMS COMMAND; WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 063 62-3-1 DIV. 8

***PHYSICAL PROPERTIES**

(DETERMINATION; *PHYSICAL PROPERTIES; *TRANSISTORS; SILICON; THEORY; MATHEMATICAL ANALYSIS; TESTS; MEASUREMENT;)
ELECTRONICS RESEARCH LAB.; U. OF CALIF.; BERKELEY.
AD-274 237 62-3-1 DIV. 8

***PHYSIOLOGY**

(*BIBLIOGRAPHY; *SPACE MEDICINE; *BIOLOGY;) (*PHYSIOLOGY; METABOLISM; NEUROLOGY; SENSORY PERCEPTION; PSYCHOLOGY; PSYCHIATRY; CLOSED-CYCLE ECOLOGICAL SYSTEMS; ASTROPHYSICS; MILITARY PERSONNEL; AVIATION PERSONNEL; PHARMACOLOGY; SAFETY; AIR SEA RESCUES;)
SCIENCE AND TECH. DIV.; LIBRARY OF CONGRESS; WASHINGTON; D. C.
AD-274 064 62-3-1 DIV. 16

***PITOT TUBES**

(*ROCKET PLANES; AIRPLANE MODELS; WIND TUNNEL MODELS; AIRPLANE NOSES; AIRPLANE PROTUBERANCES; PRESSURE; ERRORS; VORTICES; MODEL TESTS;) (*PITOT TUBES; WIND TUNNELS; INSTRUMENTATION;)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON; D. C.
AD-274 021 62-3-1 DIV. 9

***PLASMA PHYSICS**

(*PLASMA PHYSICS; DENSITY; MEASUREMENT; INSTRUMENTATION; *MICROWAVE PROBES; TEST EQUIPMENT; SPECTROGRAPHIC CAMERAS;) MICROWAVES;
ELECTRICAL ENGINEERING RESEARCH LAB.; U. OF ILLINOIS; URBANA.
AD-273 961 62-3-1 DIV. 25

(ELECTRONS; DENSITY IN *PLASMA PHYSICS;) (ELECTRONS; IONS; DISSOCIATION; RECOMBINATION REACTIONS;) *ELECTROMAGNETIC WAVES; DIFFUSION.
GEOPHYSICS CORP. OF AMERICA; BEDFORD, MASS.
AD-273 973 62-3-1 DIV. 25

(MEASUREMENT OF ABSORPTION OF *ELECTROMAGNETIC WAVES BY *PLASMA PHYSICS;) (MICROWAVE PROBES; DIODES;) COAXIAL CABLES; RADIATION LAB.; U. OF MICHIGAN; ANN ARBOR.
AD-274 014 62-3-1 DIV. 20

(*IONIC CURRENT; ANODES; THERMIONIC EMISSION; SECONDARY EMISSION; SPACE CHARGES; *PLASMA PHYSICS; GAS DISCHARGES;) USSR.
FOREIGN TECH. DIV.; AIR FORCE SYSTEMS COMMAND; WRIGHT-PATTERSON AIR FORCE BASE; OHIO.
AD-274 061 62-3-1 DIV. 8

(ELECTROMAGNETIC WAVES; *SCATTERING; DIELECTRIC PROPERTIES; CYLINDRICAL BODIES;) (WAVE TRANSMISSION; REFLECTION; *PLASMA PHYSICS; *ELECTROMAGNETIC WAVES; PROPAGATION;) DIFFERENTIAL EQUATIONS; TABLES.
LINCOLN LAB., MASS. INST. OF TECH.; LEXINGTON.
AD-274 067 62-3-1 DIV. 25

(SIMULATION OF *RADAR ECHO AREAS;) (ELECTROMAGNETIC WAVES; PROPAGATION; SCATTERING;) (*PLASMA PHYSICS; DIELECTRICS; COATINGS; TITANIUM COMPOUNDS;) SATELLITE VEHICLES.
ANTENNA LAB.; OHIO STATE U. RESEARCH FOUNDATION; COLUMBUS.
AD-274 075 62-3-1 DIV. 25

(PARTIAL DIFFERENTIAL EQUATIONS IN IONIC CURRENT; DIPOLE MOMENTS;) (INTEGRAL EQUATIONS; NUMERICAL ANALYSIS; TRIGONOMETRY; FUNCTIONS;) (INTEGRAL TRANSFORMS; MATRIX ALGEBRA; TENSOR ANALYSIS; DIELECTRIC PROPERTIES FOR ELECTRIC CURRENTS (SOURCES);) (*ELECTROMAGNETIC WAVES; *PROPAGATION IN *PLASMA PHYSICS IN MAGNETIC FIELDS;) OPERATORS (MATHEMATICS);)
ELECTRICAL ENGINEERING RESEARCH LAB.; U. OF ILLINOIS; URBANA.
AD-274 083 62-3-1 DIV. 25

(*MAGNETIC FIELDS; GAS FLOW; *SHOCK TUBES; *PLASMA PHYSICS;) (MAGNETIC EFFECTS; SHOCK TUBES; ELECTRICAL PROPERTIES;)
AVCO EVERETT RESEARCH LAB.; EVERETT, MASS.
AD-274 094 62-3-1 DIV. 9

*ELECTRONICS; *ELECTRONIC CIRCUITS; *SOLID STATE PHYSICS; SEMICONDUCTORS; PARAMETRIC AMPLIFIERS; ELECTRICAL NETWORKS; PULSE AMPLIFIERS; TRANSISTORS; OSCILLATORS; HARMONIC OSCILLATORS; AMPLIFIERS; FEEDBACK AMPLIFIERS; TRANSMISSION LINES; *COMPUTERS; *COMPUTER LOGIC; DIGITAL COMPUTERS; PROGRAMMING; THEORY; MACHINE TRANSLATION; SPECIAL FUNCTIONS; MICROWAVE AMPLIFIERS; *MICROWAVE EQUIPMENT; *PLASMA PHYSICS; WAVEGUIDES; MICROWAVES; PROPAGATION; MAGNETRONS; CYCLOTRONS; NOISE (RADIO); SLOT ANTENNAS; ANTENNAS; *ELECTROMAGNETIC WAVES; CRYSTALS; SELENIUM; LIGHT; PULSE MODULATION; CODING; LASERS; NUCLEAR MAGNETIC RESONANCE; THIN FILMS; GARNET; CONTROL SYSTEMS; *LINEAR SYSTEMS; *NONLINEAR SYSTEMS; SEQUENCES; DELAY LINES; INFORMATION THEORY; INFORMATION RETRIEVAL; TELEVISION EQUIPMENT; CIRCUIT BREAKERS; INVERTER CIRCUITS.
ELECTRONICS RESEARCH LAB.; U. OF CALIF.; BERKELEY.
AD-274 101 62-3-1 DIV. 8

(*PLASMA PHYSICS; *ELECTROMAGNETIC WAVES; *PROPAGATION;) PARTIAL DIFFERENTIAL EQUATIONS.
MICROWAVE PHYSICS LAB.; MOUNTAIN VIEW; CALIF.
AD-274 125 62-3-1 DIV. 8

(*PLASMA PHYSICS; *MICROWAVES; ABSORPTION;) (ELECTRONS; DENSITY;) PARTIAL DIFFERENTIAL EQUATIONS.
MICROWAVE PHYSICS LAB.; MOUNTAIN VIEW; CALIF.
AD-274 126 62-3-1 DIV. 25

(PLASMA PHYSICS; *GAS IONIZATION; *MAGNETIC PINCH; ELECTROMAGNETIC FIELDS;) (SHOCK TUBES; ARGON; HYDROGEN; *PLASMA PHYSICS;) (ELECTROMAGNETIC FIELDS; LOW FREQUENCY;) SCHLIEREN PHOTOGRAPHY.
MAGNETOGASDYNAMICS LAB.; MASS. INST. OF TECH.; CAMBRIDGE.
AD-274 165 62-3-1 DIV. 25

(*PLASMA PHYSICS OF COLLISION-FREE IONIZATION; *SHOCK WAVES;) (*MAGNETIC FIELDS; *MEASUREMENT; *MAGNETOHYDRODYNAMICS;) (ELECTRONS; TEMPERATURE BASED ON ULTRAVIOLET RADIATION;) (HEAT TRANSFER FROM PLASMA TO SHOCK TUBES (WALLS);)
AVCO EVERETT RESEARCH LAB.; EVERETT, MASS.
AD-274 218 62-3-1 DIV. 25

(*MASS SPECTROMETERS; DESIGN FOR *PLASMA PHYSICS;) (EXCITATION; IONS; MEASUREMENT; GASES; QUADRUPOLE MOMENTS; THERMOELECTRICITY;) (ELECTRONIC EQUIPMENT; VACUUM SYSTEMS;)
MINNESOTA U.; MINNEAPOLIS.
AD-274 249 62-3-1 DIV. 25

(MEASUREMENT AND ANALYSIS OF *PLASMA PHYSICS WITH *ELECTRON BEAMS;) (ELECTRON BEAMS; SCATTERING IN PLASMA PHYSICS; ARGON;)
RCA VICTOR CO.; LTD. (CANADA).
AD-274 266 62-3-1 DIV. 25

***PLASTIC COATINGS**

(*SUPERCONDUCTORS; THIN FILMS; PRODUCTION; MANUFACTURING METHODS BY *VAPOR PLATING; *METAL COATINGS OF METAL FILMS; LEAD; TIN AND *PLASTIC COATINGS; POLYMERS; SILICONES; ELECTRIC INSULATION;) LOW TEMPERATURE RESEARCH; LOW PRESSURE RESEARCH; ELECTRONIC EQUIPMENT; CIRCUITS.
SPACE TECHNOLOGY LABS.; INC.; LOS ANGELES, CALIF.
AD-274 030 62-3-1 DIV. 8

***PLASTICS**

(COMPATIBILITY OF *PLASTICS; *ELASTOMERS; FLUOROCARBONS; SYNTHETIC RUBBER; BUTYL RUBBER WITH *ALKALI METALS; LIQUID METALS; SODIUM; POTASSIUM; RUBIDIUM; CONTAMINATION; DETERIORATION; TEST METHODS; HIGH TEMPERATURE RESEARCH;) (PHYSICAL PROPERTIES; MECHANICAL PROPERTIES; TENSILE PROPERTIES;)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON; D. C.
AD-274 171 62-3-1 DIV. 14

(ALLOYS; *ALUMINUM ALLOYS; *MAGNESIUM ALLOYS; *TITANIUM ALLOYS; *STEEL; *STAINLESS STEEL; *NICKEL ALLOYS;) (PLASTICS; *EPOXY RESINS; *EXPANDED PLASTICS; *ACRYLIC RESINS;) (MECHANICAL PROPERTIES; ELECTRICAL PROPERTIES; PHYSICAL PROPERTIES; ELECTRICAL PROPERTIES; DATA; TABLES; INDEXES;)
REPUBLIC AVIATION CORP.; FARMINGDALE; N. Y.
AD-274 269 62-3-1 DIV. 17

***PLUTONIUM COMPOUNDS**

(*COMPLEX COMPOUNDS; *TRANSURANIC ELEMENTS; CHEMICAL PROPERTIES; SEPARATION; PRECIPITATION; *NEPTUNIUM COMPOUNDS; *PLUTONIUM COMPOUNDS; AMERICIUM COMPOUNDS; CURIUM; BERKELIUM; CALIFORNIA;) BIBLIOGRAPHY.
FOREIGN TECH. DIV.; AIR FORCE SYSTEMS COMMAND; WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 119 62-3-1 DIV. 4

***PNEUMATIC SERVOMECHANISMS**

(*PNEUMATIC SERVOMECHANISMS; *PNEUMATIC SYSTEMS; SHIELDING FROM NUCLEAR ENERGY; RADIATION DAMAGE; HIGH TEMPERATURE RESEARCH; THERMAL RADIATION;) PNEUMATIC VALVES; PRESSURE REGULATORS; SEALS; PIPE FITTINGS; BREATHER TUBES; VALVES; SERVO MOTORS; HIGH PRESSURE VALVES; CHECK VALVES; IMPELLERS; COMPRESSORS; AIRCRAFT EQUIPMENT; AIRCRAFT; RAMJET ENGINES; NUCLEAR PROPULSION; SUPERSONIC PLANES.
GENERAL DYNAMICS/CONVAIR; SAN DIEGO, CALIF.
AD-274 382 62-3-1 DIV. 1

***PNEUMATIC SYSTEMS**

(*PNEUMATIC SERVOMECHANISMS; *PNEUMATIC SYSTEMS; SHIELDING FROM NUCLEAR ENERGY; RADIATION DAMAGE; HIGH TEMPERATURE RESEARCH; THERMAL RADIATION;) PNEUMATIC VALVES; PRESSURE REGULATORS; SEALS; PIPE FITTINGS; BREATHER TUBES; VALVES; SERVO MOTORS; HIGH PRESSURE VALVES; CHECK VALVES; IMPELLERS; COMPRESSORS; AIRCRAFT EQUIPMENT; AIRCRAFT; RAMJET ENGINES; NUCLEAR PROPULSION; SUPERSONIC PLANES.
GENERAL DYNAMICS/CONVAIR; SAN DIEGO, CALIF.
AD-274 382 62-3-1 DIV. 1

***POLARIZATION**

(ELECTROSTATIC FIELDS; *LUMINESCENCE; *POLARIZATION; ZINC COMPOUNDS; SULFIDES;)
NATIONAL ELECTROTECHNICAL INST. (ITALY).
AD-274 008 62-3-1 DIV. 8

***POLYMERS**

(*RESIN ADHESIVES; *HEAT RESISTANT POLYMERS; HIGH TEMPERATURE RESEARCH; SYNTHESIS; MECHANICAL PROPERTIES; MOLECULAR WEIGHT; MOLECULAR STRUCTURE; SPECTROGRAPHIC ANALYSIS;) (*POLYMERS; METHYL RADICALS; BROMIDES; METHANES; ALLYL RADICALS; PHENOLS; POLYMERIZATION; COPOLYMERIZATION;) (*ADHESIVES FOR STAINLESS STEEL; MANUFACTURING METHODS; TEST METHODS;)
BORDEN CO.; PHILADELPHIA, PA.
AD-274 229 62-3-1 DIV. 14

(*ELASTOMERS; *POLYMERS; *URETHANES; RADIATION EFFECTS; GAMMA RAYS; NEUTRON BOMBARDMENT; DOSAGE; TEMPERATURE; HIGH TEMPERATURE RESEARCH; LOW TEMPERATURE RESEARCH; STRESSES; MECHANICAL PROPERTIES; TENSILE PROPERTIES; THEORY;) *VULCANIZATES.
GENERAL DYNAMICS/FORT WORTH; TEX.
AD-274 331 62-3-1 DIV. 14

***POTENTIAL THEORY**

(*PARTIAL DIFFERENTIAL EQUATIONS AND *POTENTIAL THEORY;) (INTEGRAL EQUATIONS; REAL VARIABLES; OPERATORS (MATHEMATICS); TAYLOR'S SERIES; SPECIAL FUNCTIONS;)
INSTITUTE FOR FLUID DYNAMICS AND APPLIED MATHEMATICS; U. OF MARYLAND; COLLEGE PARK.
AD-274 316 62-3-1 DIV. 13

***POWER SUPPLIES**

(FREQUENCY MODULATION; *INVERTER CIRCUITS; DESIGN; RECTIFIERS FOR *POWER SUPPLIES; DIRECT CURRENT;) (POWER; *MODULATORS; *SWITCHING CIRCUITS, ELECTRONIC SWITCHES;) (SILICONES; SEMICONDUCTORS; RESISTORS; NONLINEAR SYSTEMS; SOLID STATE PHYSICS; ELECTRONIC CIRCUITS;)
ADVANCED ELECTRONICS CENTER, GENERAL ELECTRIC CO.; ITHACA, N. Y.
AD-274 051 62-3-1 DIV. 7

(*BIBLIOGRAPHY; ENERGY;) (*THERMOELECTRICITY; THERMIONIC EMISSION; PHOTOEMISSION; PHOTOELECTRIC CELLS; *MAGNETOHYDRODYNAMICS; ELECTROCHEMISTRY; FUEL CELLS; PRIMARY BATTERIES; STORAGE BATTERIES; NUCLEAR ENERGY; *SOLAR ENERGY; *POWER SUPPLIES; SOLAR CELLS;)
NAVAL RESEARCH LAB.; WASHINGTON; D. C.
AD-274 070 62-3-1 DIV. 7

(*GUIDED MISSILE BATTERIES; DESIGN; SPACESHIPS; SATELLITE VEHICLES; *POWER SUPPLIES;) (*LIQUID METALS; PHYSICAL PROPERTIES; CHEMICAL PROPERTIES; ELECTRICAL PROPERTIES; POTASSIUM; MERCURY; POTASSIUM ALLOYS; MERCURY ALLOYS; ELECTRODES;) (SALTS; POTASSIUM COMPOUNDS; HYDROXIDES; BROMIDES; IODIDES; ELECTROLYTES;) (*ELECTROLYTIC CELLS; *ELECTROCHEMISTRY, THEORY, ALKALINE CELLS;) (BATTERY COMPARTMENTS; MATERIALS; STEEL; STAIN-

LESS STEEL, TUNGSTEN, MOLYBDENUM, CHROMIUM, ALUMINUM COMPOUNDS, MAGNESIUM COMPOUNDS, PHYSICAL PROPERTIES, THERMAL EXPANSION,) ELECTRIC INSULATION, CERAMIC MATERIALS, OXIDES, BATTERY SEPARATORS.
ALLISON DIV., GENERAL MOTORS CORP., INDIANAPOLIS, IND.
AD-274 197 62-3-1 DIV. 7

(FEASIBILITY STUDIES, *PRIMARY BATTERIES, *POWER SUPPLIES,) (CATHODES (ELECTROLYTIC CELL), POTASSIUM COMPOUNDS, LITHIUM COMPOUNDS, CHLORIDES, SULFATES, EUTECTICS,) (ELECTROLYTIC CELLS, ANTIMONY COMPOUNDS, COPPER, OXIDES, BORATES, SILICATES, PHOSPHATES, IRON COMPOUNDS,) PACKAGING, DESIGN, TORPEDO BATTERIES, GUIDED MISSILE BATTERIES.
UNION CARBIDE CONSUMER PRODUCTS CO., PARMA, OHIO.
AD-274 276 62-3-1 DIV. 7

***PRESSURE**

(*TRANSDUCERS, *PRESSURE, MEASUREMENT, DESIGN, TESTS, CALIBRATION,) (*HEAT TRANSFER, VIBRATION, OSCILLATION, DAMPING, STABILITY OF LIQUID ROCKET PROPELLANTS, COMBUSTION, ROCKET MOTORS, COMBUSTION CHAMBERS,) NON-DESTRUCTIVE TESTING, ROCKET MOTORS.
PRINCETON U., N. J.
AD-274 124 62-3-1 DIV. 10

***PRESSURE VESSELS**

(*PRESSURE VESSELS, *ROCKET CASES, *FILAMENT WOUND CONSTRUCTION, GLASS TEXTILES, RESINS, REINFORCING MATERIALS, PACKAGING, WIRE WINDING MACHINES, MANUFACTURING METHODS, STRUCTURES, DESIGN, STRESSES, FAILURE (MECHANICS), HYDROSTATIC PRESSURE, TEST METHODS,)
BENDIX PRODUCTS DIV., BENDIX CORP., SOUTH BEND, IND.
AD-274 091 62-3-1 DIV. 27

***PRIMARY BATTERIES**

(FEASIBILITY STUDIES, *PRIMARY BATTERIES, *POWER SUPPLIES,) (CATHODES (ELECTROLYTIC CELL), POTASSIUM COMPOUNDS, LITHIUM COMPOUNDS, CHLORIDES, SULFATES, EUTECTICS,) (ELECTROLYTIC CELLS, ANTIMONY COMPOUNDS, COPPER, OXIDES, BORATES, SILICATES, PHOSPHATES, IRON COMPOUNDS,) PACKAGING, DESIGN, TORPEDO BATTERIES, GUIDED MISSILE BATTERIES.
UNION CARBIDE CONSUMER PRODUCTS CO., PARMA, OHIO.
AD-274 276 62-3-1 DIV. 7

***PRINTED CIRCUITS**

(*PRINTED CIRCUITS, *ELECTRICAL CORONA, ELECTRIC ARCS, ELECTRIC DISCHARGES, FAILURE (MECHANICS), TESTS, DIELECTRICPROPERTIES,) (ELECTRONIC CIRCUITS, *CIRCUITS, *CONDUCTORS, TEST EQUIPMENT, HIGH ALTITUDE, HIGH TEMPERATURE RESEARCH, HUMIDITY, TESTS,) (AIRBORNE, ELECTRONIC EQUIPMENT, NAVAL EQUIPMENT, AVIATION SAFETY, SAFETY,)
NAVAL AVIONICS FACILITY, INDIANAPOLIS, IND.
AD-273 958 62-3-1 DIV. 8

***PROBABILITY**

(COMPLEX VARIABLES, STATISTICAL FUNCTIONS, *STATISTICAL DISTRIBUTIONS, *PROBABILITY, COMBINATORIAL ANALYSIS,)
NORTHWESTERN U., EVANSTON, ILL.
AD-274 019 62-3-1 DIV. 15

(*STABILITY OF RANDOM VARYING SYSTEMS, *PROBABILITY, VECTOR ANALYSIS, DIFFERENTIAL EQUATIONS, *STATISTICAL PROCESSES, DIFFERENCE EQUATIONS,) (INEQUALITIES, MATRIX ALGEBRA,)
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY.
AD-274 305 62-3-1 DIV. 15

***PROGRAMMING**

(DIGITAL COMPUTERS, *PROGRAMMING,)
RCA INDUSTRIAL ELECTRONIC PRODUCTS, CAMDEN, N. J.
AD-274 178 62-3-1 DIV. 30

***PROPAGATION**

(PARTIAL DIFFERENTIAL EQUATIONS IN IONIC CURRENT, DIPOLE MOMENTS,) (INTEGRAL EQUATIONS, NUMERICAL ANALYSIS, TRIGONOMETRY FUNCTIONS,) (INTEGRAL TRANSFORMS, MATRIX ALGEBRA, TENSOR ANALYSIS, DIELECTRIC PROPERTIES FOR ELECTRIC CURRENTS (SOURCES),) (*ELECTROMAGNETIC WAVES, *PROPAGATION IN *PLASMA PHYSICS IN MAGNETIC FIELDS,) OPERATORS (MATHEMATICS),)
ELECTRICAL ENGINEERING RESEARCH LAB., U. OF ILLINOIS, URBANA.
AD-274 083 62-3-1 DIV. 25

(*PLASMA PHYSICS, *ELECTROMAGNETIC WAVES, *PROPAGATION,) PARTIAL DIFFERENTIAL EQUATIONS.
MICROWAVE PHYSICS LAB., MOUNTAIN VIEW, CALIF.
AD-274 123 62-3-1 DIV. 8

(*ELECTROMAGNETIC WAVES, *SCATTERING, PROPAGATION IN *WAVEGUIDES,) (*COMMUNICATION SYSTEMS, *WIRE, CONDUCTIVITY, *ANTENNA RADIATION PATTERNS, HELICAL ANTENNAS,)
CRUFT LAB., HARVARD U., CAMBRIDGE, MASS.
AD-274 142 62-3-1 DIV. 25

***PROPELLANT TANKS**

(FUEL SYSTEMS, *PROPELLANT TANKS, PRESSURE CAPSULES FOR SPACE FLIGHT, *SATELLITE VEHICLES, *SPACESHIPS, SPACE ENVIRONMENTAL CONDITIONS, WEIGHTLESSNESS,) (MECHANICS, PISTONS, FUEL PUMPS, PUMPS, DIAPHRAGMS (MECHANICS), PNEUMATIC DEVICES, PRESSURE,) (CHEMISTRY, CHEMICAL ENGINEERING, DISPLACEMENT REACTIONS, SURFACE PROPERTIES,) (MAGNETISM, MAGNETOSTRICTION, ELECTROSTATICS, DIELECTRICS, ELECTRICAL EFFECTS,) (LIQUID ROCKET PROPELLANTS, ROCKET OXIDIZERS, ROCKET FUELS,) (MATERIALS, RADIATION EFFECTS, ACCELERATION, POROSITY, PHYSICAL PROPERTIES, ELASTICITY, MECHANICAL PROPERTIES, FATIGUE (MECHANICS), DEFORMATION,)
BELL AEROSYSTEMS CO., BUFFALO, N. Y.
AD-274 044 62-3-1 DIV. 27

(GUIDED MISSILES, BOOSTER ROCKETS, *LIQUID ROCKET PROPELLANTS, CRYOGENICS, LIQUEFIED GASES, HYDROGEN, FUEL TANKS, *PROPELLANT TANKS, TITANIUM, STAINLESS STEEL, THERMAL INSULATION, MANUFACTURING METHODS, WELDING, BELDS, CYLINDRICAL BODIES, CONICAL BODIES, HEMISPHERICAL SHELLS,) TEST EQUIPMENT, TEST FACILITIES, TEST METHODS, TESTS, HYDROSTATIC PRESSURE, DEFORMATION, STRAIN GAGES, TEMPERATURE, MEASUREMENT.
BEECH AIRCRAFT CORP., BOULDER, COLO.
AD-274 201 62-3-1 DIV. 10

***PROTON COUNTERS**

(*RADIATION COUNTERS OF *COSMIC RAYS AND COSMIC RAY BURSTS,) (RADIOBIOLOGY, LABORATORY ANIMALS,) (PROTONS, *PROTON COUNTERS,) SPACE ENVIRONMENTAL CONDITIONS, BALLOONS, IONIZATION.
AIR FORCE CAMBRIDGE RESEARCH LABS., BEDFORD, MASS.
AD-274 001 62-3-1 DIV. 20

***PROTONS**

(DRIFT OF *ELECTRONS AND *PROTONS IN MAGNETIC FIELDS OF EARTH,) (*TERRESTRIAL MAGNETISM, SOLAR FLARES,) (AURORAE, *ELECTRIC FIELDS AND SPACE CHARGES IN ATMOSPHERE,)
RAND CORP., SANTA MONICA, CALIF.
AD-274 182 62-3-1 DIV. 2

***QUANTUM MECHANICS**

(*QUANTUM MECHANICS, IONS AND *GAS IONIZATION IN *ELECTROMAGNETIC FIELDS,) (TRANSPORT PROPERTIES, RELAXATION TIME, *QUANTUM STATISTICS, IRREVERSIBLE PROCESSES, TENSOR ANALYSIS, MAGNETIC FIELDS,)
OSLO U. (NORWAY).
AD-274 059 62-3-1 DIV. 25

(*SOLIDS, *CRYSTALS, *CRYSTAL STRUCTURE, *QUANTUM MECHANICS, *CHEMICAL BONDS, ELECTRONS, SPIN, ATOMIC ORBITALS, THEORY,)
SOLID STATE PHYSICS, VALENCE.
UPPSALA U. (SWEDEN).
AD-274 277 62-3-1 DIV. 25

***QUANTUM STATISTICS**

(*QUANTUM MECHANICS, IONS AND *GAS IONIZATION IN *ELECTROMAGNETIC FIELDS,) (TRANSPORT PROPERTIES, RELAXATION TIME, *QUANTUM STATISTICS, IRREVERSIBLE PROCESSES, TENSOR ANALYSIS, MAGNETIC FIELDS,)
OSLO U. (NORWAY).
AD-274 059 62-3-1 DIV. 25

***QUARTZ CRYSTALS**

(*QUARTZ RESONATORS, *CRYSTAL OSCILLATORS, *QUARTZ CRYSTALS, CRYSTAL HOLDERS, HIGH FREQUENCY, MEDIUM FREQUENCY, DESIGN, MANUFACTURING METHODS, MILITARY REQUIREMENTS,) COMMUNICATION EQUIPMENT.
UNION THERMOELECTRIC DIV., COMPTOMETER CORP., NILES, ILL.
AD-274 031 62-3-1 DIV. 8

***QUARTZ RESONATORS**

(*QUARTZ RESONATORS, *CRYSTAL OSCILLATORS, *QUARTZ CRYSTALS, CRYSTAL HOLDERS, HIGH FREQUENCY, MEDIUM FREQUENCY, DESIGN, MANUFACTURING METHODS, MILITARY REQUIREMENTS,) COMMUNICATION EQUIPMENT.
UNION THERMOELECTRIC DIV., COMPTOMETER CORP., NILES, ILL.
AD-274 031 62-3-1 DIV. 8

***RADAR ECHO AREAS**

(*SATELLITE VEHICLES, BALLOONS, REFLECTORS, *RADAR ECHO AREAS, RADAR REFLECTIONS, L BAND, ULTRA HIGH FREQUENCY, MEASUREMENT,) (SPHERES, SPACE ENVIRONMENTAL CONDITIONS, ANALYSIS,) (RADIO COMMUNICATION SYSTEMS, VOICE COMMUNICATION SYSTEMS, RADIO *WAVES, REFLECTION,)
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 065 62-3-1 DIV. 6

(SIMULATION OF *RADAR ECHO AREAS,) (ELECTROMAGNETIC WAVES, PROPAGATION, SCATTERING,) (*PLASMA PHYSICS, DIELECTRICS, COATINGS, TITANIUM COMPOUNDS,) SATELLITE VEHICLES.
ANTENNA LAB., OHIO STATE U. RESEARCH FOUNDATION, COLUMBUS.
AD-274 075 62-3-1 DIV. 25

(*SCATTERING OF RADIO WAVES BY CYLINDRICAL BODIES, WIRE,) (ELECTROMAGNETIC WAVES, RADIOFREQUENCY,) (*RADAR ECHO AREAS, *RADAR REFLECTIONS,)
PICKARD AND BURNS, INC., NEEDHAM, MASS.
AD-274 150 62-3-1 DIV. 8

***RADAR INTERCEPTION**

(*PHASE SHIFTERS, *PARAMETRIC AMPLIFIERS, *MICROWAVE AMPLIFIERS, VERY HIGH FREQUENCY, ULTRA HIGH FREQUENCY, P BAND, L BAND, DESIGN,) (AMPLIFIERS, MODEL TESTS, TRANSISTORS, SEMICONDUCTORS, CRYSTALS, KLYSTRONS, MODULATION, MEASUREMENT,) (*RADIO INTERCEPTION, *RADAR INTERCEPTION, NOISE (RADIO), BROADBAND,)
HRB-SINGER, INC., STATE COLLEGE, PA.
AD-273 959 62-3-1 DIV. 8

***RADAR RECEIVERS**

(AUTOMATIC, FREQUENCY, CONTROL FOR *RADAR RECEIVERS AND *RADIO RECEIVERS, ANALYSIS,) (DETECTION AND TRACKING OF RADIO SIGNALS, RADAR SIGNALS, RADAR PULSES,) ELECTRONIC CIRCUITS, TRIGGER CIRCUITS, TUNING CIRCUITS, DISCRIMINATORS, LIMITERS, FREQUENCY CONVERTERS, OSCILLATORS, INTERMEDIATE FREQUENCY AMPLIFIERS, VIDEO AMPLIFIERS, PULSE AMPLIFIERS, ELECTRONIC INTEGRATORS, RADIOFREQUENCY OSCILLATORS, PULSE DISCRIMINATORS, SENSITIVITY, ERRORS, DESIGN.
ELECTRONIC DEFENSE LABS., MOUNTAIN VIEW, CALIF.
AD-274 306 62-3-1 DIV. 8

***RADAR REFLECTIONS**

(*SCATTERING OF RADIO WAVES BY CYLINDRICAL BODIES, WIRE,) (ELECTROMAGNETIC WAVES, RADIOFREQUENCY,) (*RADAR ECHO AREAS, *RADAR REFLECTIONS,)
PICKARD AND BURNS, INC., NEEDHAM, MASS.
AD-274 150 62-3-1 DIV. 8

***RADAR TRACKING**

(*FALLING BODIES, *SPHERES, MEASUREMENT OF ATMOSPHERE, DENSITY BY *RADAR TRACKING,) *ATMOSPHERIC SOUNDING.
AIR FORCE CAMBRIDGE RESEARCH LABS., BEDFORD, MASS.
AD-274 213 62-3-1 DIV. 2

***RADAR TRAILERS**

(*ANTIAIRCRAFT DEFENSE SYSTEMS, *SHELTERS, *PARTICLE FILTERS, *RADAR TRAILERS, PORTABLE SHELTERS, AIR CONDITIONING EQUIPMENT, SAFETY DEVICES, PNEUMATIC DEVICES, TRAILERS, VEHICLES, INSTALLATION, DESIGN,) (AEROSOLS, BIOLOGICAL WARFARE, CHEMICAL WARFARE, RADIOLOGICAL WARFARE,)
HUGHES AIRCRAFT CO., FULLERTON, CALIF.
AD-274 245 62-3-1 DIV. 3

***RADIATION COUNTERS**

(*RADIATION COUNTERS OF *COSMIC RAYS AND COSMIC RAY BURSTS,) (RADIOBIOLOGY, LABORATORY ANIMALS,) (PROTONS, *PROTON COUNTERS,) SPACE ENVIRONMENTAL CONDITIONS, BALLOONS, IONIZATION.
AIR FORCE CAMBRIDGE RESEARCH LABS., BEDFORD, MASS.
AD-274 001 62-3-1 DIV. 20

***RADIATION EFFECTS**

(CRAZING OF GLASS BY ELECTROMAGNETIC WAVES AND *THERMAL RADIATION FROM EXPLODING WIRES,) (EXPLOSIONS, WIRE,) (*THERMAL STRESSES, HEAT,) *RADIATION EFFECTS.
SPACE SCIENCES LAB., GENERAL ELECTRIC CO., PHILADELPHIA, PA.
AD-273 970 62-3-1 DIV. 25

(*RADIOBIOLOGY, RADIATION INJURIES, LABORATORY ANIMALS, BRAINS, BLOOD, RECOVERY, SURVIVAL,) (*RADIATION EFFECTS OF ULTRA HIGH FREQUENCY, *MICROWAVES, *ULTRAVIOLET RADIATION, X RAYS, GAMMA RAYS, IONIZATION,) DOSE RATE.
ROCHESTER U., N. Y.
AD-274 338 62-3-1 DIV. 16

***RADIO COMMUNICATION SYSTEMS**

(*ANTIAIRCRAFT DEFENSE SYSTEMS; AIRCRAFT; FLIGHT PATHS; DETECTION BY SCATTERING OF RADIO WAVES DURING FLIGHT OVER *RADIO COMMUNICATION SYSTEMS; TESTS.) (RADIO SIGNALS; *DATA PROCESSING SYSTEMS.) (RADIO TRANSMISSION; RADIO INTERFERENCE; *WAVE TRANSMISSION; AMPLITUDE MODULATION; FREQUENCY MODULATION; PROPAGATION.)
BENDIX SYSTEMS DIV., BENDIX CORP., ANN ARBOR, MICH.
AD-274 282 62-3-1 DIV. 6

***RADIO INTERCEPTION**

(*PHASE SHIFTERS; *PARAMETRIC AMPLIFIERS; *MICROWAVE AMPLIFIERS; VERY HIGH FREQUENCY; ULTRA HIGH FREQUENCY; P BAND; L BAND; DESIGN.) (AMPLIFIERS; MODEL TESTS; TRANSISTORS; SEMICONDUCTORS; CRYSTALS; KLYSTRONS; MODULATION; MEASUREMENT.) (*RADIO INTERCEPTION; *RADAR INTERCEPTION; NOISE (RADIO); BROADBAND.)
HRB-SINGER, INC., STATE COLLEGE, PA.
AD-273 959 62-3-1 DIV. 8

***RADIO RECEIVERS**

(AUTOMATIC FREQUENCY CONTROL FOR *RADAR RECEIVERS AND *RADIO RECEIVERS; ANALYSIS.) (DETECTION AND TRACKING OF RADIO SIGNALS; RADAR SIGNALS; RADAR PULSES.)
ELECTRONIC CIRCUITS; TRIGGER CIRCUITS; TUNING CIRCUITS; DISCRIMINATORS; LIMITERS; FREQUENCY CONVERTERS; OSCILLATORS; INTERMEDIATE FREQUENCY AMPLIFIERS; VIDEO AMPLIFIERS; PULSE AMPLIFIERS; ELECTRONIC INTEGRATORS; RADIOFREQUENCY OSCILLATORS; PULSE DISCRIMINATORS; SENSITIVITY; ERRORS; DESIGN.
ELECTRONIC DEFENSE LABS., MOUNTAIN VIEW, CALIF.
AD-274 386 62-3-1 DIV. 8

***RADIO SIGNALS**

(*RADIO SIGNALS; *DETECTION; SIGNAL-TO-NOISE RATIO; CORRELATION TECHNIQUES.) (*STATISTICAL PROCESSES; PROBABILITY; STATISTICAL ANALYSIS; MATRIX ALGEBRA; INTEGRAL TRANSFORMS; *STATISTICAL TESTS.)
BROWN U. DIV. OF APPLIED MATHEMATICS, PROVIDENCE, R. I.
AD-274 202 62-3-1 DIV. 6

***RADIO WAVES**

(EXCITATION OF *ANTENNAS; IMPEDANCE; *RADIO WAVES.) (ELECTROMAGNETIC WAVES; PROPAGATION.) INTEGRAL EQUATIONS.
GORDON MCKAY LAB. OF APPLIED PHYSICS, HARVARD U., CAMBRIDGE, MASS.
AD-274 377 62-3-1 DIV. 25

***RADIOACTIVE BATTERIES**

(*BIBLIOGRAPHY; *THERMOELECTRICITY; GENERATORS; MATERIALS; RADIATION EFFECTS; RELIABILITY; *FAILURE (MECHANICS); AGING.) (*RADIOACTIVE BATTERIES; NUCLEAR POWER PLANTS; NUCLEAR ENERGY; SELENIUM; TELLURIUM; REACTOR FUELS; TELLURIUM COMPOUNDS.)
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
AD-273 953 62-3-1 DIV. 7

***RADIOACTIVE FALL-OUT**

(*ARCTIC REGIONS; *DECONTAMINATION; *RADIOACTIVE FALL-OUT.) (MILITARY FACILITIES; CONTAMINATION; TRACER STUDIES; SIMULATION; EXPERIMENTAL DATA; EFFECTIVENESS.)
NUCLEAR DEFENSE LAB., ARMY CHEMICAL CENTER, MD.
AD-274 259 62-3-1 DIV. 20

***RADIOACTIVE WASTE DISPOSAL**

(EVAPORATORS; DISTILLING PLANTS; FEED PUMPS; STORAGE TANKS; DEMINERALIZERS.) *RADIOACTIVE WASTE DISPOSAL.
PFAUDLER CO., ROCHESTER, N. Y.
AD-273 977 62-3-1 DIV. 20

***RADIOBIOLOGY**

(*RADIOBIOLOGY; RADIATION INJURIES; LABORATORY ANIMALS; BRAINS; BLOOD; RECOVERY; SURVIVAL.) (*RADIATION EFFECTS OF ULTRA HIGH FREQUENCY; *MICROWAVES; *ULTRAVIOLET RADIATION; X RAYS; GAMMA RAYS; IONIZATION.) DOSE RATE.
ROCHESTER U., N. Y.
AD-274 338 62-3-1 DIV. 16

***RADIOFREQUENCY ATTENUATORS**

(*ELECTRIC DETONATORS; *ELECTRIC IGNITERS; *RADIOFREQUENCY ATTENUATORS; ELECTROMAGNETIC WAVES; HAZARDS; BROADBAND; ABSORPTION; ATTENUATION; MEASUREMENT; MATERIALS; DESIGN.) (LOW FREQUENCY; RADIOFREQUENCY ATTENUATORS; MEASUREMENT; MATHEMATICAL ANALYSIS.) FERRITES; IRON COMPOUNDS; CARBONYL RADICALS; POWDERS; DIELECTRICS; RADIOFREQUENCY FILTERS; PHOSPHORS; OXIDES; ZINC COMPOUNDS; COPPER CATALYSTS; LUMINESCENT MATERIALS; PHOTOSENSITIVITY; RESISTORS.
LABORATORIES FOR RESEARCH AND DEVELOPMENT, FRANKLIN INST., PHILADELPHIA, PA.
AD-274 239 62-3-1 DIV. 8

***RADIOFREQUENCY OSCILLATIONS**

(*SEMICONDUCTORS; *DIODES; *OSCILLATORS; *RADIOFREQUENCY OSCILLATIONS; THEORY; MATHEMATICAL ANALYSIS; NON-LINEAR DIFFERENTIAL EQUATIONS.)
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY.
AD-274 236 62-3-1 DIV. 8

***RADIOMETERS**

(*RADIOMETERS; SUN; ATMOSPHERE; HEAT.) (*THERMOCOUPLES; SILVER WIRE; BISMUTH WIRE.) VARNISHES; *RECORDING DEVICES; SOLAR SPECTRUM.
ARMY SIGNAL RESEARCH AND DEVELOPMENT LAB., FORT MONMOUTH, N. J.
AD-274 298 62-3-1 DIV. 30

***RADOMES**

(*RADOMES; MATERIALS; PROCESSING; TEMPERATURE.) (*REFRACTORY MATERIALS; *CERAMIC MATERIALS; ALUMINUM COMPOUNDS; MAGNESIUM COMPOUNDS; SILICON COMPOUNDS; OXIDES; PREPARATION; SINTERING.) (PHYSICAL PROPERTIES; DENSITY; CRYSTAL STRUCTURE; POROSITY; SOLID STATE PHYSICS.)
RUTGERS U. SCHOOL OF CERAMICS, NEW BRUNSWICK, N. J.
AD-274 183 62-3-1 DIV. 14

***RARE EARTHS**

(*PHONONS; ELECTRONS; METALS; IONS; CONDUCTIVITY; LEAD; SODIUM; *RARE EARTHS; *SPECTROGRAPHIC ANALYSIS.)
CALIFORNIA U., LA JOLLA.
AD-273 993 62-3-1 DIV. 25

***REACTOR SHIELDING MATERIALS**

(*BIBLIOGRAPHY; *SHIELDING; *REACTOR SHIELDING MATERIALS.) (RADIATION HAZARDS; MOON; SPACE FLIGHT; MANNED; COSMIC RAYS; SOLAR FLARES; NUCLEAR POWER PLANTS.) (SCATTERING; NEUTRONS; GAMMA RAYS.) (EXPOSURE SUITS; CONCRETE; LEAD; ALUMINUM; BERYLLIUM; BORON COMPOUNDS; IRON; WATER.)
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
AD-274 015 62-3-1 DIV. 21

***RECOMBINATION REACTIONS**

(ORGANIC COMPOUNDS; ALKYL RADICALS; *SULFIDES; *THIOLS; PHOTOLYSIS; *DISSOCIATION; CHEMICAL BONDS; ENERGY; REACTION KINETICS; CHEMICAL REACTIONS; *RECOMBINATION REACTIONS; DISPROPORTIONATION; THERMOCHEMISTRY; *FREE RADICALS.) PHOTOCHEMICAL REACTIONS; SPECTROGRAPHIC ANALYSIS; LOW TEMPERATURE RESEARCH.
LUND U. (SWEDEN).
AD-274 252 62-3-1 DIV. 4

***RECORDING DEVICES**

(*RADIOMETERS; SUN; ATMOSPHERE; HEAT.) (*THERMOCOUPLES; SILVER WIRE; BISMUTH WIRE.) VARNISHES; *RECORDING DEVICES; SOLAR SPECTRUM.
ARMY SIGNAL RESEARCH AND DEVELOPMENT LAB., FORT MONMOUTH, N. J.
AD-274 298 62-3-1 DIV. 30

***RE-ENTRY VEHICLES**

(*RE-ENTRY VEHICLES; SIMULATION OF FLIGHT; RE-ENTRY AERODYNAMICS; LIFT; GRAVITY; CELESTIAL MECHANICS; MOTION; OSCILLATION; THEORY; MATHEMATICAL ANALYSIS.) (GEOMETRY; CONFIGURATION OF EARTH; SURFACES.) SATELLITE VEHICLES; TRIANGULAR WINGS.
MICHIGAN U., ANN ARBOR.
AD-274 291 62-3-1 DIV. 9

***REFRACTORY MATERIALS**

(*TITANIUM COMPOUNDS; *BORIDES; *REFRACTORY MATERIALS; THERMODYNAMICS; *VAPORIZATION; HEAT OF FORMATION; HEAT OF SUBLIMATION; THERMOCHEMISTRY; DECOMPOSITION; MASS SPECTROSCOPY; HIGH TEMPERATURE RESEARCH.)
UNION CARBIDE CORP., PARMA, OHIO.
AD-273 978 62-3-1 DIV. 4

(*ROCKET MOTOR NOZZLES; ROCKET MOTORS; SOLID ROCKET PROPELLANTS; *REFRACTORY MATERIALS; CERAMIC MATERIALS; *THERMAL INSULATION; THERMAL CONDUCTIVITY; *HEAT TRANSFER; TEMPERATURE; COMBUSTION CHAMBER GASES; PRESSURE; DESIGN; DEPOSITS.) TUNGSTEN; GRAPHITE; CARBIDES; PLASTICS; PHENOLIC RESINS; ASBESTOS FIBER; STEEL.
AEROJET-GENERAL CORP., SACRAMENTO, CALIF.
AD-274 140 62-3-1 DIV. 27

(BRITTLE MATERIALS; *REFRACTORY MATERIALS; *TUNGSTEN; *SINGLE CRYSTALS; GROWTH; PREPARATION; PURIFICATION; ZONE MELTING; ELECTRON BOMBARDMENT; THERMIONIC EMISSION.) (CRYSTAL STRUCTURE; DEFORMATION; FRACTURE (MECHANICS); TENSILE PROPERTIES; SHEAR STRESSES; STRESSES; LATTICES; PLASTICITY; PLASTIC FLOW; TRANSITION TEMPERATURE; CRYSTALLIZATION.) (*MOLYBDENUM ALLOYS; *RHENIUM ALLOYS.) ALLOYS; METALS; LOW TEMPERATURE RESEARCH.
GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
AD-274 151 62-3-1 DIV. 17

(*RADOMES; MATERIALS; PROCESSING; TEMPERATURE.) (*REFRACTORY MATERIALS; *CERAMIC MATERIALS; ALUMINUM COMPOUNDS; MAGNESIUM COMPOUNDS; SILICON COMPOUNDS; OXIDES; PREPARATION; SINTERING.) (PHYSICAL PROPERTIES; DENSITY; CRYSTAL STRUCTURE; POROSITY; SOLID STATE PHYSICS.)
RUTGERS U. SCHOOL OF CERAMICS, NEW BRUNSWICK, N. J.
AD-274 183 62-3-1 DIV. 14

(*ROCKET MOTOR NOZZLES; MATERIALS; *REFRACTORY MATERIALS; THERMAL INSULATION; ABLATION; CORROSION BY EXHAUST GASES; VAPORIZATION; THERMODYNAMICS; THERMAL EXPANSION; ELECTRICAL PROPERTIES; RESISTANCE; HALL EFFECT; HIGH TEMPERATURE RESEARCH; MECHANICAL PROPERTIES; PURIFICATION.) (GRAPHITE; *CARBIDES AND *BORIDES OF HAFNIUM COMPOUNDS; NIOBIUM COMPOUNDS; TITANIUM COMPOUNDS; ZIRCONIUM COMPOUNDS.) (TUNGSTEN; TANTALUM; MOLYBDENUM; COMPATIBILITY; TITANIUM COMPOUNDS; BORIDES.) (ZIRCONIUM COMPOUNDS; BORIDES; HEAT OF FORMATION.)
UNION CARBIDE RESEARCH INST., TARRYTOWN, N. Y.
AD-274 186 62-3-1 DIV. 27

(*MATERIALS; METALS; *REFRACTORY MATERIALS; ALLOYS.) (FRACTURE (MECHANICS); STRESSES; DAMPING; STRUCTURES; WELDING.) (ELECTRONICS; ELECTRONIC SYSTEMS; GUIDANCE.) (SEALS; HYDRAULIC SYSTEMS; HYDRAULIC FLUIDS.) (COATINGS; NIOBIUM; OXIDATION.) (RIVETS; ALUMINUM ALLOYS; CHEMICAL MILLING.) (TITANIUM ALLOYS; BERYLLIUM; IRON; STAINLESS STEEL; PLASTICS.) (SOLAR CELLS; SILICON.)
REPUBLIC AVIATION CORP., FARMINGDALE, N. Y.
AD-274 339 62-3-1 DIV. 14

***REINFORCING MATERIALS**

(*LAMINATES; *REINFORCING MATERIALS; *GLASS; GLASS TEXTILES; *MICA; DISKS; FILMS; PLASTICS; STRUCTURES; MATERIALS.) (PROCESSING; FILAMENT WOUND CONSTRUCTION; CASTING; MOLDING; HYDROSTATIC PRESSURE.) (TESTS; STRESSES; DEFORMATION; MECHANICAL PROPERTIES; ELECTRICAL PROPERTIES; TENSILE PROPERTIES.) (BEAMS; CYLINDRICAL BODIES; ROCKET MOTOR NOZZLES; CONTAINERS; SCREW THREADS; BATTERY COMPARTMENTS.)
NARMCO INDUSTRIES, INC., SAN DIEGO, CALIF.
AD-274 332 62-3-1 DIV. 14

(*REINFORCING MATERIALS; *GLASS TEXTILES; *CERAMIC FIBERS; *METALLIC TEXTILES; *FIBERS; *WIRE; SINGLE CRYSTALS; METALS; CERAMIC MATERIALS; GRAPHITE; PRODUCTION; DRAWING (MACHINE PROCESSING); EXTRUSION; CASTING; GROWTH; MECHANICAL PROPERTIES; PHYSICAL PROPERTIES; BIBLIOGRAPHY.
CLEVITE CORP., CLEVELAND, OHIO.
AD-274 379 62-3-1 DIV. 14

***RELAXATION TIME**

(*THERMODYNAMICS; *THEORY OF *ELASTICITY; VISCOSITY; *RELAXATION TIME.) (*IRREVERSIBLE PROCESSES; MATRIX ALGEBRA; INTEGRAL TRANSFORMS.)
NORTH CAROLINA STATE COLL., RALEIGH.
AD-274 248 62-3-1 DIV. 25

***RELIABILITY**

(*DATA PROCESSING SYSTEMS; EFFECTIVENESS; *RELIABILITY.) (*STATISTICAL PROCESSES; *TIME; PROBABILITY.)
DAVID TAYLOR MODEL BASIN, WASHINGTON, D. C.
AD-274 350 62-3-1 DIV. 30

***REMOTE CONTROL SYSTEMS**

(*REMOTE CONTROL SYSTEMS; RADIO SIGNALS; SERVO SYSTEMS; COMMAND SYSTEMS; *TIME LAG THEORY.) (MOON; VEHICLES; TRACKING; DISPLAY SYSTEMS; FEEDBACK; HUMAN ENGINEERING.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 172 62-3-1 DIV. 8

***REPORTS**

(*REPORTS; SCIENTIFIC REPORTS; CONFERENCES; *TRANSLATIONS; PERIODICALS; *BIB-

LIOGRAPHY.) (*SCIENTIFIC RESEARCH; MILITARY RESEARCH; ELECTRONICS; RADAR; RADIO; COMMUNICATION SYSTEMS; COMPUTERS.)
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 253 62-3-1 DIV. 32

*RESEARCH PROGRAM ADMINISTRATION

(LIGHT; AMPLIFIERS; *RESEARCH PROGRAM ADMINISTRATION.) (*PHOTOELECTRIC EFFECT; PHOTOELECTRIC TRANSDUCERS.) PHOTONS.
OFFICE OF AEROSPACE RESEARCH, WASHINGTON, D. C.
AD-274 028 62-3-1 DIV. 30

*RESIN ADHESIVES

(*CRYOGENICS; *ADHESIVES; *RESIN ADHESIVES; STAINLESS STEEL (301; 304; 310); ALUMINUM ALLOYS (2014; 2219; 5456); TITANIUM ALLOYS; FRACTURE (MECHANICS); MECHANICAL PROPERTIES.) (SPACE ENVIRONMENTAL CONDITIONS; PNEUMATIC DEVICES; PLASTICS; ELASTOMERS; ADHESION; LUBRICATION; THERMAL EXPANSION; THERMAL INSULATION.) (*HIGH TEMPERATURE RESEARCH; *HEAT RESISTANT ALLOYS; REFRACTORY MATERIALS; STAINLESS STEEL (301); M(11); TITANIUM ALLOYS; REFRACTORY COATINGS; *METALS; *ALLOYS; NIOBIUM ALLOYS (FS 821.) (SPACESHIPS; SATELLITE VEHICLES.)
GENERAL DYNAMICS/ASTRONAUTICS, SAN DIEGO, CALIF.
AD-274 211 62-3-1 DIV. 14

(*RESIN ADHESIVES; *HEAT RESISTANT POLYMERS; HIGH TEMPERATURE RESEARCH; SYNTHESIS; MECHANICAL PROPERTIES; MOLECULAR WEIGHT; MOLECULAR STRUCTURE; SPECTROGRAPHIC ANALYSIS.) (*POLYMERS; METHYL RADICALS; BROMIDES; METHANES; ALLYL RADICALS; PHENOLS; POLYMERIZATION; COPOLYMERIZATION.) (*ADHESIVES FOR STAINLESS STEEL; MANUFACTURING METHODS; TEST METHODS.)
BORDEN CO., PHILADELPHIA, PA.
AD-274 229 62-3-1 DIV. 14

*RESPIRATION

(*RESPIRATION; CLOSED-CYCLE ECOLOGICAL SYSTEMS; OXYGEN; METABOLISM.) (WATER VAPOR; DISPOSAL AND RECOVERY; CARBON DIOXIDE; ADSORPTION.) (FREEZE DRYING; DEHYDRATION; *DECONTAMINATION; FEASIBILITY STUDIES.)
AIRESEARCH MFG. CO., LOS ANGELES, CALIF.
AD-274 141 62-3-1 DIV. 16

*RHENIUM ALLOYS

(BRITTLE MATERIALS; *REFRACTORY MATERIALS; *TUNGSTEN; *SINGLE CRYSTALS; GROWTH; PREPARATION; PURIFICATION; ZONE MELTING; ELECTRON BOMBARDMENT; THERMIONIC EMISSION.) (CRYSTAL STRUCTURE; DEFORMATION; FRACTURE (MECHANICS); TENSILE PROPERTIES; SHEAR STRESSES; STRESSES; LATTICES; PLASTICITY; PLASTIC FLOW; TRANSITION TEMPERATURE; CRYSTALLIZATION.) (*MOLYBDENUM ALLOYS; *RHENIUM ALLOYS.) ALLOYS; METALS; LOW TEMPERATURE RESEARCH.
GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
AD-274 151 62-3-1 DIV. 17

*ROCKET CASES

(*ROCKET CASES; GLASS TEXTILES; FILAMENT WOUND CONSTRUCTION; DESIGN; CONFIGURATION; ANALYSIS; MODEL TESTS; HYDROSTATIC PRESSURE; HEMISPHERICAL SHELLS; DEFLECTION; EQUATIONS; DATA.) (GUIDED MISSILES; UNDERWATER TO SURFACE.)
KIDDE, WALTER, AND CO., INC., BELLEVILLE, N. J.
AD-273 964 62-3-1 DIV. 27

(*ROCKET CASES; *FILAMENT WOUND CONSTRUCTION; MATERIALS; FIBERS; *SYNTHETIC FIBERS; FILAMENTS; GLASS TEXTILES; IMPREGNATION; COATINGS; RESINS; HEAT RESISTANT POLYMERS.) HYDROSTATIC PRESSURE; HIGH PRESSURE RESEARCH; HIGH TEMPERATURE RESEARCH; TENSILE PROPERTIES; FAILURE (MECHANICS); TESTS.
AEROJET-GENERAL CORP., AZUSA, CALIF.
AD-273 991 62-3-1 DIV. 27

(*ROCKET CASES; *SANDWICH CONSTRUCTION; *FILAMENT WOUND CONSTRUCTION; HONEYCOMB CORES; GLASS TEXTILES; DESIGN; MODEL TESTS; STRESSES; MATHEMATICAL ANALYSIS; LAMINATES; RESINS; REINFORCING MATERIALS; NYLON; PLASTICS.) (MONOCOQUES; BERYLLIUM; STEEL; TITANIUM.) (TEST METHODS; CYLINDRICAL BODIES; STRESSES; FAILURE (MECHANICS); LOAD DISTRIBUTION.) EXPANDED PLASTICS; ADHESIVES; BONDING.
NORTH AMERICAN AVIATION, INC., DOWNEY, CALIF.
AD-274 069 62-3-1 DIV. 27

(*PRESSURE VESSELS; *ROCKET CASES; *FILAMENT WOUND CONSTRUCTION; GLASS TEXTILES; RESINS; REINFORCING MATERIALS; PACKAGING; WIRE WINDING MACHINES; MANUFACTURING METHODS; STRUCTURES; DESIGN; STRESSES; FAILURE (MECHANICS); HYDROSTATIC PRESSURE; TEST METHODS.)
BENDIX PRODUCTS DIV., BENDIX CORP., SOUTH BEND, IND.
AD-274 091 62-3-1 DIV. 27

(*ROCKET CASES; *TITANIUM ALLOYS; VANADIUM ALLOYS; CHROMIUM ALLOYS; ALUMINUM ALLOYS; MANUFACTURING METHODS; FORGING; HEAT TREATMENT; WELDING; ELECTRIC ARCS; ELECTRON BEAMS; MECHANICAL PROPERTIES; MICROSTRUCTURE; AGING.) TENSILE PROPERTIES.
PRATT AND WHITNEY AIRCRAFT, EAST HARTFORD, CONN.
AD-274 334 62-3-1 DIV. 17

*ROCKET MOTOR NOZZLES

(ROCKET MOTORS; SOLID ROCKET PROPELLANTS; *ROCKET MOTOR NOZZLES OF *TUNGSTEN; EROSION; THERMAL STRESSES; SHOCK; STRESSES; TESTS; MATHEMATICAL ANALYSIS.) (EFFECTIVENESS OF SIMULATION OF EXHAUST GASES BY PLASMA JETS.) HIGH TEMPERATURE RESEARCH.
STANFORD RESEARCH INST., MENLO PARK, CALIF.
AD-274 131 62-3-1 DIV. 27

(*ROCKET MOTOR NOZZLES; ROCKET MOTORS; SOLID ROCKET PROPELLANTS; *REFRACTORY MATERIALS; CERAMIC MATERIALS; *THERMAL INSULATION; THERMAL CONDUCTIVITY; *HEAT TRANSFER; TEMPERATURE; COMBUSTION CHAMBER GASES; PRESSURE; DESIGN; DEPOSITS.) TUNGSTEN; GRAPHITE; CARBIDES; PLASTICS; PHENOLIC RESINS; ASBESTOS FIBER; STEEL.
AEROJET-GENERAL CORP., SACRAMENTO, CALIF.
AD-274 140 62-3-1 DIV. 27

(*ROCKET MOTOR NOZZLES; MATERIALS; *REFRACTORY MATERIALS; THERMAL INSULATION; ABLATION; CORROSION BY EXHAUST GASES; VAPORIZATION; THERMODYNAMICS; THERMAL EXPANSION; ELECTRICAL PROPERTIES; RESISTANCE; HALL EFFECT; HIGH TEMPERATURE RESEARCH; MECHANICAL PROPERTIES; PURIFICATION.) (GRAPHITE; *CARBIDES AND *BORIDES OF HAFNIUM COMPOUNDS; NIOBIUM COMPOUNDS; TITANIUM COMPOUNDS; ZIRCONIUM COMPOUNDS.) (TUNGSTEN; TANTALUM; MOLYBDENUM; COMPATIBILITY; TITANIUM COMPOUNDS; BORIDES.) (ZIRCONIUM COMPOUNDS; BORIDES; HEAT OF FORMATION.)
UNION CARBIDE RESEARCH INST., TARRYTOWN, N. Y.
AD-274 186 62-3-1 DIV. 27

*ROCKET PLANES

(*ROCKET PLANES; AIRPLANE MODELS; WIND TUNNEL MODELS; AIRPLANE NOSES; AIRPLANE PROTUBERANCES; PRESSURE; ERRORS; VORTICES; MODEL TESTS.) (*PITOT TUBES; WIND TUNNELS; INSTRUMENTATION.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 021 62-3-1 DIV. 9

*ROCKETS

(FLIGHT TESTING OF *SOUNDING ROCKETS FOR MEASUREMENT OF SOLAR WINDS, PROTONS BEYOND OUTER RADIATION BELT.) (ANALYSIS OF FLIGHT PATHS OF TEST VEHICLES; SUPERSONIC TEST VEHICLES.) (POSITION FINDING OF SOUNDING ROCKETS FROM TELEMETERING DATA.) (RADAR TRACKING; OPTICAL TRACKING OF *ROCKETS ON UPPER ATMOSPHERE.) PROTONS; *INTERSTELLAR MATTER; TELEMETER SYSTEMS.
AIR FORCE SPECIAL WEAPONS CENTER, KIRTLAND AIR FORCE BASE, N. MEX.
AD-274 086 62-3-1 DIV. 2

*ROLLER BEARINGS

(BEARINGS; *BALL BEARINGS; *ROLLER BEARINGS; LUBRICATION; FATIGUE (MECHANICS).) (*LUBRICATION; *PLASTICITY; DEFORMATION; *HYDRODYNAMICS; THEORY.) (FILMS; ELECTRICAL CONDUCTANCE; X-RAY SPECTROSCOPY.) (SURFACES; FAILURE (MECHANICS); METALS; TRANSPORT PROPERTIES; TRACER STUDIES.) TEST EQUIPMENT; LUBRICANTS.
SKF INDUSTRIES, INC., PHILADELPHIA, PA.
AD-274 137 62-3-1 DIV. 26

***SAFETY**

(*HUMAN ENGINEERING; *GUIDED MISSILE LAUNCHERS; MAINTENANCE; OPERATION; CONTROL PANELS; DISPLAY SYSTEMS;) (*SAFETY; HAZARDS; MAINTENANCE PERSONNEL;)
AMERICAN MACHINE AND FOUNDRY CO., GREENWICH, CONN.
AD-274 290 62-3-1 DIV. 12

(*HUMAN ENGINEERING; *GUIDED MISSILE LAUNCHERS; MAINTENANCE; OPERATION; CONTROL PANELS; DISPLAY SYSTEMS;) (*SAFETY; HAZARDS; MAINTENANCE PERSONNEL; PORTABLE PLATFORMS; DOLLIES;)
AMERICAN MACHINE AND FOUNDRY CO., GREENWICH, CONN.
AD-274 291 62-3-1 DIV. 12

(*HUMAN ENGINEERING; *GUIDED MISSILE LAUNCHERS; MAINTENANCE; ERRORS; ANALYSIS; OPERATION; CONTROL PANELS; DISPLAY SYSTEMS; *SAFETY;)
AMERICAN MACHINE AND FOUNDRY CO., GREENWICH, CONN.
AD-274 292 62-3-1 DIV. 12

***SANDWICH CONSTRUCTION**

(*ROCKET CASES; *SANDWICH CONSTRUCTION; *FILAMENT BOUND CONSTRUCTION; HONEYCOMB CORES; GLASS TEXTILES; DESIGN; MODEL TESTS; STRESSES; MATHEMATICAL ANALYSIS; LAMINATES; RESINS; REINFORCING MATERIALS; NYLON; PLASTICS;) (MONOCOQUES; BERYLLIUM; STEEL; TITANIUM;) (TEST METHODS; CYLINDRICAL BODIES; STRESSES; FAILURE (MECHANICS); LOAD DISTRIBUTION;) EXPANDED PLASTICS; ADHESIVES; BONDING.
NORTH AMERICAN AVIATION, INC., DOWNEY, CALIF.
AD-274 069 62-3-1 DIV. 27

***SATELLITE VEHICLE TRAJECTORIES**

(SATELLITE VEHICLES; ORBITAL FLIGHT PATHS; *SATELLITE VEHICLE TRAJECTORIES; *DYNAMICS; CELESTIAL MECHANICS; PERTURBATION THEORY; MATHEMATICAL ANALYSIS; THEORY; EQUATIONS; DIFFERENTIAL EQUATIONS;) (DIGITAL COMPUTERS; PROGRAMMING;)
LAND-AIR, INC., POINT MUGU, CALIF.
AD-274 108 62-3-1 DIV. 12

***SATELLITE VEHICLES**

(*GUIDED MISSILES; SURFACE TO SURFACE; *INTERCEPTION PROBABILITIES USING *SATELLITE VEHICLES; PROBABILITY; STATISTICAL FUNCTIONS; POLYNOMIALS; MATHEMATICAL ANALYSIS;)
AIR FORCE OFFICE OF SCIENTIFIC RESEARCH, WASHINGTON, D. C.
AD-273 996 62-3-1 DIV. 12

(*SATELLITE VEHICLES; SPACE PROBES; INSTRUMENTATION; ELECTRONIC EQUIPMENT; RADIO TRANSMITTERS; DATA TRANSMISSION SYSTEMS; *MAGNETOMETERS; RUBIDIUM; VAPOR PLATING; VAPORS; INSTALLATION;) (*AIRFRAMES; SPIN STABILIZED AMMUNITION; DESIGN; TESTS; MANUFACTURING METHODS;) (COSMIC RAYS; MAGNETIC FIELDS; MEASUREMENT;)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 020 62-3-1 DIV. 12

(FUEL SYSTEMS; *PROPELLANT TANKS; PRESSURE CAPSULES FOR SPACE FLIGHT; *SATELLITE VEHICLES; *SPACESHIPS; SPACE ENVIRONMENTAL CONDITIONS; *WEIGHTLESSNESS;) (MECHANICS; PISTONS; FUEL PUMPS; PUMPS; DIAPHRAGMS (MECHANICS); PNEUMATIC DEVICES; PRESSURE;) (CHEMISTRY; CHEMICAL ENGINEERING; DISPLACEMENT REACTIONS; SURFACE PROPERTIES;) (MAGNETISM; MAGNETOSTRICTION; ELECTROSTATICS; DIELECTRICS; ELECTRICAL EFFECTS;) (LIQUID ROCKET PROPELLANTS; ROCKET OXIDIZERS; ROCKET FUELS;) (MATERIALS; RADIATION EFFECTS; ACCELERATION; POROSITY; PHYSICAL PROPERTIES; ELASTICITY; MECHANICAL PROPERTIES; FATIGUE (MECHANICS); DEFORMATION;)
BELL AEROSYSTEMS CO., BUFFALO, N. Y.
AD-274 044 62-3-1 DIV. 27

(*SATELLITE VEHICLES; BALLOONS; REFLECTORS; *RADAR ECHO AREAS; RADAR REFLECTIONS; L BAND; ULTRA HIGH FREQUENCY; MEASUREMENT;) (SPHERES; SPACE ENVIRONMENTAL CONDITIONS; ANALYSIS;) (RADIO COMMUNICATION SYSTEMS; VOICE COMMUNICATION SYSTEMS; RADIO WAVES; REFLECTION;)
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 065 62-3-1 DIV. 6

(*SATELLITE VEHICLES; ORBITAL FLIGHT PATHS; SATELLITE VEHICLE TRAJECTORIES; LIFE EXPECTANCY; MOTION; GRAVITY; *CELESTIAL MECHANICS; PERTURBATION THEORY; THEORY; MATHEMATICAL ANALYSIS; MATHEMATICAL PREDICTION; DIFFERENTIAL EQUATIONS;)
NAVAL SUPERSONIC LAB., MASS. INST. OF TECH., CAMBRIDGE.
AD-274 113 62-3-1 DIV. 12

(MATHEMATICAL PREDICTION; EQUATIONS FOR HEAT; SOLAR ENERGY; ALBEDO (ASTRONOMY); HEAT PRODUCTION; THERMAL RADIATION; SPACE ENVIRONMENTAL CONDITIONS; *THERMODYNAMICS OF *SATELLITE VEHICLES IN ORBITAL FLIGHT PATHS;) (GUIDED MISSILE BATTERIES; ELECTRICAL EQUIPMENT; HEAT PRODUCTION;)
(*TEMPERATURE CONTROL; RADIATORS; PAINTS; HEAT TRANSFER; HEAT EXCHANGERS;) *SYMPOSIA.
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
AD-274 101 62-3-1 DIV. 12

(*SATELLITE VEHICLES; SPACE ENVIRONMENTAL CONDITIONS; THERMAL RADIATION; SOLAR ENERGY; HEAT; HEAT PRODUCTION; *THERMODYNAMICS;) (*TEMPERATURE CONTROL OF SURFACES BY ABSORPTION; REFLECTION; HEAT TRANSFER; RADIATORS; PAINTS;) (RADIATION EFFECTS ON MATERIALS;) *SYMPOSIA.
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
AD-274 102 62-3-1 DIV. 12

(*SATELLITE VEHICLES; SPACE PROBES; INSTRUMENTATION FOR MEASUREMENT OF *COSMIC RAYS; *SOLAR FLARES; SOLAR ENERGY; VAN ALLEN RADIATION BELT; *TERRESTRIAL MAGNETISM IN UPPER ATMOSPHERE; IONOSPHERE; SPACE ENVIRONMENTAL CONDITIONS;) ASTROPHYSICS; GEOPHYSICS.
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
AD-274 169 62-3-1 DIV. 2

(*SATELLITE VEHICLES; ORBITAL FLIGHT PATHS; TRACKING TELESCOPES; ASTRONOMICAL DATA; TABLES;)
ASTROPHYSICAL OBSERVATORY, SMITHSONIAN INSTITUTION, CAMBRIDGE, MASS.
AD-274 342 62-3-1 DIV. 12

(*SATELLITE VEHICLES; ORBITAL FLIGHT PATHS; TRACKING TELESCOPES; ASTRONOMICAL DATA; TABLES;)
ASTROPHYSICAL OBSERVATORY, SMITHSONIAN INSTITUTION, CAMBRIDGE, MASS.
AD-274 343 62-3-1 DIV. 12

(*SATELLITE VEHICLES; ORBITAL FLIGHT PATHS; TRACKING TELESCOPES; ASTRONOMICAL DATA; TABLES;)
ASTROPHYSICAL OBSERVATORY, SMITHSONIAN INSTITUTION, CAMBRIDGE, MASS.
AD-274 344 62-3-1 DIV. 12

(*SATELLITE VEHICLES; ORBITAL FLIGHT PATHS; TRACKING TELESCOPES; ASTRONOMICAL DATA; TABLES;)
ASTROPHYSICAL OBSERVATORY, SMITHSONIAN INSTITUTION, CAMBRIDGE, MASS.
AD-274 345 62-3-1 DIV. 12

(*SATELLITE VEHICLES; ORBITAL FLIGHT PATHS; SATELLITE VEHICLE TRAJECTORIES; SATELLITE ATTITUDE; *CELESTIAL MECHANICS; PERTURBATION THEORY;)
ASTROPHYSICAL OBSERVATORY, SMITHSONIAN INSTITUTION, CAMBRIDGE, MASS.
AD-274 347 62-3-1 DIV. 12

***SCATTERING**

(ELECTROMAGNETIC WAVES; *SCATTERING; DIELECTRIC PROPERTIES; CYLINDRICAL BODIES;) (WAVE TRANSMISSION; REFLECTION; *PLASMA PHYSICS; *ELECTROMAGNETIC WAVES; PROPAGATION;) DIFFERENTIAL EQUATIONS; TABLES.
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 067 62-3-1 DIV. 25

(*ELECTROMAGNETIC WAVES; *SCATTERING; PROPAGATION IN *WAVEGUIDES;) (*COMMUNICATION SYSTEMS; *WIRE; CONDUCTIVITY; *ANTENNA RADIATION PATTERNS; HELICAL ANTENNAS;)
CRUFT LAB., HARVARD U., CAMBRIDGE, MASS.
AD-274 142 62-3-1 DIV. 25

(*SCATTERING OF RADIO WAVES BY CYLINDRICAL BODIES; *WIRE;) (ELECTROMAGNETIC WAVES; RADIOFREQUENCY;) (*RADAR ECHO AREAS; *RADAR REFLECTIONS;)
PICKARD AND BURNS, INC., NEEDHAM, MASS.
AD-274 150 62-3-1 DIV. 8

(*LIGHT; *TRANSMISSION; *SCATTERING; FOG; HAZE; SMOKES; MEASUREMENT; INSTRUMENTATION;) (BALLOONS; PHOTOFLASH BULBS; CAMERAS;) LIGHT TRANSMISSION.
TECHNICAL OPERATIONS, INC., BURLINGTON, MASS.
AD-274 185 62-3-1 DIV. 25

***SCIENTIFIC RESEARCH**

(*SPACE FLIGHT; *MANNED; *SCIENTIFIC RESEARCH; SPACE MEDICINE; BEHAVIOR; *HUMAN ENGINEERING; STRESS (PHYSIOLOGY); STRESS (PSYCHOLOGY);) (*COMPUTERS; LOGISTICS; COSTS;) (*PERSONNEL; SCIENTIFIC PERSONNEL; ENGINEERING PERSONNEL; TRAINING;) SPACE ENVIRONMENTAL CONDITIONS; SIMULATION.
CORNELL AERONAUTICAL LAB., INC., BUFFALO, N. Y.
AD-274 053 62-3-1 DIV. 12

(*REPORTS; SCIENTIFIC REPORTS; CONFERENCES; *TRANSLATIONS; PERIODICALS; *BIBLIOGRAPHY;) (*SCIENTIFIC RESEARCH; MILITARY RESEARCH; ELECTRONICS; RADAR; RADIO; COMMUNICATION SYSTEMS; COMPUTERS;)
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 293 62-3-1 DIV. 32

***SEISMIC WAVES**

(*SEISMOLOGICAL STATIONS; SEISMOGRAPHS; *SEISMIC WAVES; BACKGROUND NOISE; GEOPHYSICS; GEOLOGY; CALIFORNIA; WASHINGTON;)
UNITED ELECTRODYNAMICS, PASADENA, CALIF.
AD-274 080 62-3-1 DIV. 2

(DETECTION OF *UNDERGROUND EXPLOSIONS; EARTHQUAKES; EXPLOSIONS BY *SEISMOGRAPHS;) *SEISMIC WAVES; ELECTROMAGNETIC WAVES; MEASUREMENT; OCEAN BOTTOM; GEOLOGY; GREAT BRITAIN.
ACOUSTICS AND SEISMICS LAB., U. OF MICHIGAN, ANN ARBOR.
AD-274 106 62-3-1 DIV. 2

(*NUCLEAR EXPLOSIONS; TEST FACILITIES;) (NUCLEAR EXPLOSIONS; *SEISMIC WAVES; MEASUREMENT; INSTRUMENTATION;) (GAGES; STRESS GAGES; STRAIN GAGES; ACCELEROMETERS; VELOCITY GAGES; VIBRATION PICKUPS; SEISMOGRAPHS;) (CRATERING; MEASUREMENT;)
STANFORD RESEARCH INST., MENLO PARK, CALIF.
AD-274 341 62-3-1 DIV. 30

***SEISMOGRAPHS**

(DETECTION OF *UNDERGROUND EXPLOSIONS; EARTHQUAKES; EXPLOSIONS BY *SEISMOGRAPHS;) *SEISMIC WAVES; ELECTROMAGNETIC WAVES; MEASUREMENT; OCEAN BOTTOM; GEOLOGY; GREAT BRITAIN.
ACOUSTICS AND SEISMICS LAB., U. OF MICHIGAN, ANN ARBOR.
AD-274 106 62-3-1 DIV. 2

***SEISMOLOGICAL STATIONS**

(*SEISMOLOGICAL STATIONS; SEISMOGRAPHS; *SEISMIC WAVES; BACKGROUND NOISE; GEOPHYSICS; GEOLOGY; CALIFORNIA; WASHINGTON;)
UNITED ELECTRODYNAMICS, PASADENA, CALIF.
AD-274 080 62-3-1 DIV. 2

***SELENIUM COMPOUNDS**

(*ELECTRONS; *SELENIUM COMPOUNDS; FLUORIDES; MEASUREMENT OF IMPACT SHOCK WITH IONS;) (*ELECTRON CAPTURE; MOLECULES; VIBRATION; FREQUENCY NEGATIVE ION STUDY;) QUANTUM MECHANICS.
SPACE TECHNOLOGY LABS., INC., LOS ANGELES, CALIF.
AD-274 272 62-3-1 DIV. 25

***SEMICONDUCTING FILMS**

(*SEMICONDUCTORS; *SEMICONDUCTING FILMS; *SINGLE CRYSTALS; GROWTH; CRYSTAL STRUCTURE; SOLID STATE PHYSICS; TRANSPORT PROPERTIES; ATOMIC ENERGY LEVELS; ELECTRICAL PROPERTIES; HALL EFFECT; IMPURITIES; COPPER; SILVER; GOLD;) (DIODES; THIN FILMS OF CADMIUM COMPOUNDS; SULFIDES ON ZINC COMPOUNDS; TELLURIDES; LUMINESCENCE; FLUORESCENCE;) (ZINC COMPOUNDS; SELENIDES; TELLURIDES;)
GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
AD-274 152 62-3-1 DIV. 25

***SEMICONDUCTORS**

(*SPECTROGRAPHIC ANALYSIS OF *CHEMICAL IMPURITIES IN *SEMICONDUCTORS;) (SEMICONDUCTORS; ARSENIDES; GALLIUM COMPOUNDS; ELECTRICAL PROPERTIES; CRYSTALLIZATION;) (PRODUCTION OF SEMICONDUCTORS;) VAPORIZATION.
GENERAL TELEPHONE AND ELECTRONICS LABS., INC., BAYSIDE, N. Y.
AD-273 989 62-3-1 DIV. 25

(SOLID STATE PHYSICS; *SOLAR CELLS; *GENERATORS; DESIGN;) (*PHOTOELECTRIC CELLS; METALS AND *SEMICONDUCTORS; CADMIUM COMPOUNDS; SULFIDES; *PHOTOCONDUCTIVITY; *ELECTRIC POWER PRODUCTION;)
GIANNINI CONTROLS CORP., PASADENA, CALIF.
AD-273 976 62-3-1 DIV. 7

(*SEMICONDUCTORS; ELECTRICAL PROPERTIES; *OPTICS;) (MAGNETIC PROPERTIES; INFRARED RADIATION; ABSORPTION;) (PARAMETRIC RESONANCE; SILICON;) (GERMANIUM; THERMAL CONDUCTIVITY; MATERIALS;)
PURDUE RESEARCH FOUNDATION, LAFAYETTE, IND.
AD-273 975 62-3-1 DIV. 25

(*ELECTRONICS; *TEXTBOOKS; USSR;) (ELECTRON TUBES; AMPLIFIERS; RADIO RECEIVERS; RADIO TRANSMITTERS;) (ELECTRON TUBES; SUPERHIGH FREQUENCY;) ELECTRONS; THEORY; *ELECTRON OPTICS; THERMIONIC EMISSION; PHOTOEMISSION; *CATHODES; OXIDE CATHODES; *DIODES; *TRIODES; TETRODES; PENTODES; *ELECTRON TUBES; FREQUENCY CONVERTERS; *SEMICONDUCTORS; *CATHODE RAY TUBES; KLYSTRONS; MAGNETRONS; TRAVELING WAVE TUBES; *PHOTOTUBES; PHOTOMULTIPLIERS; X RAYS; ELECTRON TUBES.
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 063 62-3-1 DIV. 6

(*SEMICONDUCTORS; *SEMICONDUCTING FILMS; *SINGLE CRYSTALS; GROWTH; CRYSTAL STRUCTURE; SOLID STATE PHYSICS; TRANSPORT PROPERTIES; ATOMIC ENERGY LEVELS; ELECTRICAL PROPERTIES; HALL EFFECT; IMPURITIES; COPPER; SILVER; GOLD.) (DIODES; THIN FILMS OF CADMIUM COMPOUNDS; SULFIDES ON ZINC COMPOUNDS; TELLURIDES; LUMINESCENCE; FLUORESCENCE.) (ZINC COMPOUNDS; SELENIDES; TELLURIDES.)
GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
AD-274 152 62-3-1 DIV. 25

(SILICON; SILICON COMPOUNDS; *CARBIDES; RADIATION TOLERANCE; *SEMICONDUCTORS.) (HIGH FREQUENCY; *TRANSISTORS; THERMAL UTILIZATION; TEST EQUIPMENT.)
STURTEVANT DIV., WESTINGHOUSE ELECTRIC CORP., BOSTON, MASS.
AD-274 187 62-3-1 DIV. 25

(*SEMICONDUCTORS; *DIODES; *OSCILLATORS; *RADIOFREQUENCY OSCILLATIONS; THEORY; MATHEMATICAL ANALYSIS; NON-LINEAR DIFFERENTIAL EQUATIONS.)
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY.
AD-274 236 62-3-1 DIV. 8

(*TRANSISTORS; *SEMICONDUCTORS; *SEMICONDUCTING FILMS; MANUFACTURING METHODS; VAPORS; DEPOSITS ON SINGLE CRYSTALS; THIN FILMS OF SILICON ON BORON; SILICON COMPOUNDS; DIOXIDES; IMPURITIES; DIFFUSION.) (RESISTANCE; ELECTRICAL PROPERTIES; CONTROL.) (VAPORS; CHLORIDES; SILANES; DECOMPOSITION.) (PHOSPHORUS COMPOUNDS; OXYCHLORIDES.)
PACIFIC SEMICONDUCTORS, INC., LAWNDALE, CALIF.
AD-274 263 62-3-1 DIV. 8

(*SEMICONDUCTORS; SANDWICH CONSTRUCTION; *SINGLE CRYSTALS; GROWTH; MANUFACTURING METHODS; IMPURITIES; ELECTRICAL PROPERTIES; RESISTANCE; HALL EFFECT; *INTERMETALLIC COMPOUNDS.) (DEPOSITS OF GALLIUM ON GALLIUM COMPOUNDS; ARSENIDES AND CHROMIUM ON SILICON COMPOUNDS; CARBIDES.) (PENETRATION OF GALLIUM INTO GALLIUM COMPOUNDS; ARSENIDES.)
CRYSTAL OVENS; LABORATORY EQUIPMENT.
TYCO, INC., WALTHAM, MASS.
AD-274 273 62-3-1 DIV. 25

(*SEMICONDUCTORS; *PARAMETRIC AMPLIFIERS; *MICROWAVE AMPLIFIERS; *DIODES; DESIGN FOR HELIXES; PARAMETRIC AMPLIFIERS; DISTRIBUTED AMPLIFIERS WITH COAXIAL CABLES; MICROWAVE OSCILLATORS; EXTREMELY HIGH FREQUENCY; *FREQUENCY MULTIPLIERS.) (AMPLIFIERS; GERMANIUM; GALLIUM COMPOUNDS; ANTIMONIDES; DESIGN; THEORY; NOISE (RADIO); NOISE (RADAR).) (AMPLIFIERS WITH NEGATIVE RESISTANCE CIRCUITS; TRANSMISSION LINES; HALL EFFECT; SOLID STATE PHYSICS.) (*FREQUENCY SHIFT CONVERTERS; ULTRA HIGH FREQUENCY; S BAND; ELECTRONIC CIRCUITS; *MICROWAVE EQUIPMENT; NONLINEAR SYSTEMS; PUMPS; THEORY; MATHEMATICAL ANALYSIS.)
DAVID SARNOFF RESEARCH CENTER, PRINCETON, N. J.
AD-274 348 62-3-1 DIV. 8

(*DIODES; *SEMICONDUCTORS; HIGH TEMPERATURE RESEARCH; CRYSTALS; GROWTH; ELECTRONS; DIFFUSION; SOLUBILITY; MEASUREMENT; ELECTROPLATING; GAMMA RAYS.) (*GALLIUM COMPOUNDS; ARSENIDES; COPPER; GERMANIUM; SILICON; POTASSIUM; ALUMINUM.)
GENERAL ELECTRIC CO., SYRACUSE, N. Y.
AD-274 391 62-3-1 DIV. 8

*SHEETS

(*CASTINGS; MOLDING; MANUFACTURING METHODS; ROLLING MILLS; *SHEETS; METALS; ALLOYS; LIQUID METALS; STEEL; IRON.) (ELECTRIC WELDING; *ARC WELDING; *WELDING; ELECTRON BEAMS; AUTOMATIC; PRESSURE; VIBRATION; ULTRASONICS; SLAGS.) USSR.
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 120 62-3-1 DIV. 26

(*TITANIUM ALLOYS; ALUMINUM ALLOYS; MOLYBDENUM ALLOYS; VANADIUM ALLOYS; *SHEETS; PROCESSING; MANUFACTURING METHODS; ROLLING MILLS; HEAT TREATMENT; MECHANICAL PROPERTIES; TENSILE PROPERTIES.)
CRUCIBLE STEEL CO. OF AMERICA, MIDLAND, PA.
AD-274 204 62-3-1 DIV. 17

(*SHEETS; REFRACTORY MATERIALS; METALS; ALLOYS; *TUNGSTEN ALLOYS; POWDER METALLURGY; MELTING; ELECTRIC ARCS; PREPARATION SINTERING; CONTROLLED ATMOSPHERES; HYDROGEN; LOW PRESSURE RESEARCH; ROLLING MILLS; HEAT TREATMENT; HARDNESS; MICROSTRUCTURE; TRANSITION TEMPERATURE.) (POWDER ALLOYS; POWDER METALS; TUNGSTEN; MANGANESE; IRON; COBALT; NICKEL; RUTHENIUM; RHODIUM; PALLADIUM; RHENIUM; OSMIUM; IRIDIUM; PLATINUM; PARTICLES; ADDITIVES; OXIDES; THORIUM COMPOUNDS; ZIRCONIUM COMPOUNDS.) HEAT RESISTANT ALLOYS.
BATTELLE MEMORIAL INST., COLUMBUS, OHIO.
AD-274 374 62-3-1 DIV. 17

(*SHEETS AND *CYLINDRICAL BODIES; *DRAG IN A *SUPERSONIC FLOW; *CONTINUUM MECHANICS; *MOLECULES; GAS FLOW; VISCOSITY.) (HEAT TRANSFER; *SUPERAERODYNAMICS; MACH NUMBER.)
INSTITUTE OF ENGINEERING RESEARCH, U. OF CALIF., BERKELEY.
AD-274 385 62-3-1 DIV. 9

*SHELTERS

(*ANTIAIRCRAFT DEFENSE SYSTEMS; *SHELTERS; *PARTICLE FILTERS; *RADAR TRAILERS; PORTABLE SHELTERS; AIR CONDITIONING EQUIPMENT; SAFETY DEVICES; PNEUMATIC DEVICES; TRAILERS; VEHICLES; INSTALLATION; DESIGN.) (AEROSOLS; BIOLOGICAL WARFARE; CHEMICAL WARFARE; RADIOLOGICAL WARFARE.)
HUGHES AIRCRAFT CO., FULLERTON, CALIF.
AD-274 245 62-3-1 DIV. 3

*SHIELDING

(*BIBLIOGRAPHY; *SHIELDING; *REACTOR SHIELDING MATERIALS.) (RADIATION HAZARDS; MOON; SPACE FLIGHT; MANNED; COSMIC RAYS; SOLAR FLARES; NUCLEAR POWER PLANTS.) (SCATTERING; NEUTRONS; GAMMA RAYS.) (EXPOSURE SUITS; CONCRETE; LEAD; ALUMINUM; BERYLLIUM; BORON COMPOUNDS; IRON; WATER.)
LOCKHEED AIRCRAFT CORP., SUNNYVALE, CALIF.
AD-274 015 62-3-1 DIV. 21

*SHIP HULLS

(PITCH; ROLL; DAMPING; *FREQUENCY ANALYZERS; TABLES.) (OSCILLATION OF *SHIP HULLS.) (HARMONIC ANALYSIS; INTEGRAL EQUATIONS.)
CARNEGIE INST. OF TECH., PITTSBURGH, PA.
AD-274 104 62-3-1 DIV. 25

*SHIPS

(RADIOACTIVE FALL-OUT; SIMULATION; *RADIOLOGICAL CONTAMINATION; SEAWATER; NUCLEAR WEAPONS; DETONATION; CONTAMINATION; SHIP DECKS.) (*SHIPS; SHIP PLATES; *DECONTAMINATION; ARTIFICIAL RADIOACTIVITY; LABORATORIES; TEST FACILITIES; TEST METHODS; TESTS.)
NAVAL RADIOLOGICAL DEFENSE LAB., SAN FRANCISCO, CALIF.
AD-274 187 62-3-1 DIV. 20

*SHOCK TUBES

(*SHOCK TUBES; *SYMPOSIA.) (INSTRUMENTATION; OPERATION AND CONSTRUCTION OF SHOCK TUBES.) HYPERSONIC WIND TUNNELS.
BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
AD-274 039 62-3-1 DIV. 30

(*MAGNETIC FIELDS; GAS FLOW; *SHOCK TUBES; *PLASMA PHYSICS.) (MAGNETIC EFFECTS; SHOCK TUBES; ELECTRICAL PROPERTIES.)
AVCO EVERETT RESEARCH LAB., EVERETT, MASS.
AD-274 096 62-3-1 DIV. 9

(DETERMINATION OF PRESSURE; *BLAST IN TUNNELS RESULTING FROM EXTERIOR *UNDERGROUND STRUCTURES; *NUCLEAR EXPLOSIONS.) (ATTENUATION; PROPAGATION, REFLECTION OF SHOCK WAVES IN TUNNELS.) (BLAST; SHIELDING.) (*SHOCK TUBES FOR TESTING, BLAST IN TUNNELS.)
BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
AD-274 228 62-3-1 DIV. 22

(*UNDERGROUND STRUCTURES; SOILS; AIR BLAST; LOAD DISTRIBUTION; *THERMONUCLEAR EXPERIMENTS; MODEL TESTS; DYNAMICS; SIMULATION; MATHEMATICAL ANALYSIS.) (UNDERGROUND STRUCTURES; *NUCLEAR EXPLOSIONS; BLAST; PRESSURE; *SHOCK TUBES; STRESSES; STATISTICAL ANALYSIS; THEORY.) (PROPAGATION AND ATTENUATION OF *SHOCK WAVES; DAMPING.)
AMERICAN MACHINE AND FOUNDRY CO., NILES, ILL.
AD-274 294 62-3-1 DIV. 13

*SHOCK WAVES

(*PLASMA PHYSICS OF COLLISION-FREE IONIZATION; *SHOCK WAVES.) (*MAGNETIC FIELDS; MEASUREMENT; *MAGNETOHYDRODYNAMICS.) (ELECTRONS; TEMPERATURE BASED ON ULTRAVIOLET RADIATION.) (HEAT TRANSFER FROM PLASMA TO SHOCK TUBES (WALLS).)
AVCO EVERETT RESEARCH LAB., EVERETT, MASS.
AD-274 218 62-3-1 DIV. 25

(*UNDERGROUND STRUCTURES; SOILS; AIR BLAST; LOAD DISTRIBUTION; *THERMONUCLEAR EXPERIMENTS; MODEL TESTS; DYNAMICS; SIMULATION; MATHEMATICAL ANALYSIS.) (UNDERGROUND STRUCTURES; *NUCLEAR EXPLOSIONS; BLAST; PRESSURE; *SHOCK TUBES; STRESSES; STATISTICAL ANALYSIS; THEORY.) (PROPAGATION AND ATTENUATION OF *SHOCK WAVES; DAMPING.)
AMERICAN MACHINE AND FOUNDRY CO., NILES, ILL.
AD-274 294 62-3-1 DIV. 13

*SHROUDED PROPELLERS

(*FLYING PLATFORMS; GROUND EFFECT; DESIGN.) (INDUCTION SYSTEMS; DUCT INLETS; *SHROUDED PROPELLERS; DUCTED FANS; *DUCTS; CONFIGURATION; AERODYNAMICS.) (NOZZLES; GAS FLOW; JETS; VELOCITY; THRUST; PRESSURE; EFFECTIVENESS; MATHEMATICAL ANALYSIS.)
KELLETT AIRCRAFT CORP., PHILADELPHIA, PA.
AD-274 159 62-3-1 DIV. 1

*SILICIDES

(*CERAMIC MATERIALS; *GRAPHITE; THERMAL RADIATION; BLACKBODY RADIATION; ABSORPTION; HEAT TRANSFER FROM SURFACES.) (*CARBIDES OF SILICON COMPOUNDS; TANTALUM COMPOUNDS; TUNGSTEN COMPOUNDS; ZIRCONIUM COMPOUNDS; NICKEL ALLOYED WITH TITANIUM COMPOUNDS.) (*NITRIDES OF BORON COMPOUNDS.) (*OXIDES OF ALUMINUM COMPOUNDS; BERYLLIUM COMPOUNDS; MAGNESIUM COMPOUNDS; ZIRCONIUM COMPOUNDS.) (*SILICIDES OF MOLYBDENUM COMPOUNDS.) DATA; TABLES.
DEFENSE METALS INFORMATION CENTER, COLUMBUS, OHIO.
AD-274 148 62-3-1 DIV. 14

*SILICON COMPOUNDS

(*SINGLE CRYSTALS; *SILICON COMPOUNDS; *CARBIDES; PRODUCTION; GROWTH BY PYROLYSIS OF METHYL RADICALS; CHLORIDES; SILANES.) (ELASTICITY; MECHANICAL PROPERTIES; TENSILE PROPERTIES; PHYSICAL PROPERTIES; DENSITY; DETERMINATION.) TEST EQUIPMENT; TEST METHODS; X-RAY DIFFRACTION ANALYSIS.
CORNELL AERONAUTICAL LAB., INC., BUFFALO, N. Y.
AD-273 997 62-3-1 DIV. 14

(*METALORGANIC COMPOUNDS; CARBON COMPOUNDS; *SILICON COMPOUNDS; *GERMANIUM COMPOUNDS; *TIN COMPOUNDS; *LEAD COMPOUNDS; PHENYL RADICALS; BENZENES; *LUMINESCENT MATERIALS; PHOSPHORESCENT MATERIALS; *LUMINESCENCE; PHOSPHORESCENCE; FLUORESCENCE; SPECTROGRAPHIC ANALYSIS; ULTRAVIOLET SPECTROSCOPY; ABSORPTION; ULTRAVIOLET RADIATION; EXCITATION; HALF LIFE; PHOSPHORESENT DECAY.) (THEORY; QUANTUM MECHANICS; ELECTRON TRANSITIONS.)
AERONAUTICAL RESEARCH LAB., OFFICE OF AEROSPACE RESEARCH, WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 295 62-3-1 DIV. 25

*SINGLE CRYSTALS

(*SINGLE CRYSTALS; *SILICON COMPOUNDS; *CARBIDES; PRODUCTION; GROWTH BY PYROLYSIS OF METHYL RADICALS; CHLORIDES; SILANES.) (ELASTICITY; MECHANICAL PROPERTIES; TENSILE PROPERTIES; PHYSICAL PROPERTIES; DENSITY; DETERMINATION.) TEST EQUIPMENT; TEST METHODS; RAY DIFFRACTION ANALYSIS.
CORNELL AERONAUTICAL LAB., INC., BUFFALO, N. Y.
AD-273 997 62-3-1 DIV. 14

(*ALUMINUM; *SINGLE CRYSTALS; *DEFORMATION; ELASTICITY; PLASTICITY; MECHANICAL PROPERTIES; LOW TEMPERATURE RESEARCH; HIGH TEMPERATURE RESEARCH; PHOTOGRAPHIC ANALYSIS; MICROPHOTOGRAPHY.)
JOHNS HOPKINS U., BALTIMORE, MD.
AD-274 107 62-3-1 DIV. 25

(*ALUMINUM; *MAGNESIUM; *IRON; *SINGLE CRYSTALS; *DEFORMATION; STRESSES; SHEAR STRESSES; PLASTIC FLOW; THEORY; PREPARATION.)
NOTRE DAME U., IND.
AD-274 116 62-3-1 DIV. 25

(BRITTLE MATERIALS; *REFRACTORY MATERIALS; *TUNGSTEN; *SINGLE CRYSTALS; GROWTH; PREPARATION; PURIFICATION; ZONE MELTING; ELECTRON BOMBARDMENT; THERMIONIC EMISSION.) (CRYSTAL STRUCTURE; DEFORMATION; FRACTURE (MECHANICS); TENSILE PROPERTIES; SHEAR STRESSES; STRESSES; LATTICES; PLASTICITY; PLASTIC FLOW; TRANSITION TEMPERATURE; CRYSTALLIZATION.) (*MOLYBDENUM ALLOYS; *RHENIUM ALLOYS.) ALLOYS; METALS; LOW TEMPERATURE RESEARCH.
GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
AD-274 151 62-3-1 DIV. 17

(*SEMICONDUCTORS; *SEMICONDUCTING FILMS; *SINGLE CRYSTALS; GROWTH; CRYSTAL STRUCTURE; SOLID STATE PHYSICS; TRANSPORT PROPERTIES; ATOMIC ENERGY LEVELS; ELECTRICAL PROPERTIES; HALL EFFECT; IMPURITIES; COPPER; SILVER; GOLD.) (DIODES; THIN FILMS OF CADMIUM COMPOUNDS; SULFIDES ON ZINC COMPOUNDS; TELLURIDES; LUMINESCENCE; FLUORESCENCE.) (ZINC COMPOUNDS; SELENIDES; TELLURIDES.)
GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
AD-274 152 62-3-1 DIV. 25

(*SEMICONDUCTORS; SANDWICH CONSTRUCTION; *SINGLE CRYSTALS; GROWTH; MANUFACTURING METHODS; IMPURITIES; ELECTRICAL PROPERTIES; RESISTANCE; HALL EFFECT; *INTERMETALLIC COMPOUNDS.) (DEPOSITS OF GALLIUM ON GALLIUM COMPOUNDS; ARSENIDES AND CHROMIUM ON SILICON COMPOUNDS; CARBIDES.) (PENETRATION OF GALLIUM INTO GALLIUM COMPOUNDS; ARSENIDES.)
CRYSTAL OVENS; LABORATORY EQUIPMENT.
TYCO, INC., WALTHAM, MASS.
AD-274 273 62-3-1 DIV. 25

*SKIN

(*SKIN; *BODY TEMPERATURE; BLOOD CIRCULATION; TEMPERATURE CONTROL; HEAT TRANSFER; HEAT PRODUCTION (BIOLOGY); SWEAT COOLING; DEHYDRATION.)
ST. LOUIS U., MO.
AD-274 078 62-3-1 DIV. 16

***SKY BRIGHTNESS**

(*AURORAE; *SPECTROGRAPHIC ANALYSIS; MEASUREMENT; SPECTROPHOTOMETERS; HYDROGEN; RADIO SIGNALS; REFLECTION.) (*SKY BRIGHTNESS; SPECTROGRAPHIC ANALYSIS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON; D. C.
AD-274 326 62-3-1 DIV. 2

***SMALL ARMS**

(*AUTOMATIC WEAPONS; *SMALL ARMS; *FEED MECHANISMS; EFFECTIVENESS; TESTS.) (SMALL ARMS AMMUNITION; PACKAGING; CONTAINERS.)
ARMY INFANTRY BOARD; FORT BENNING; GA.
AD-274 367 62-3-1 DIV. 22

***SOLAR ENERGY**

(*BIBLIOGRAPHY; ENERGY.) (*THERMOELECTRICITY; THERMIONIC EMISSION; PHOTOEMISSION; PHOTOELECTRIC CELLS; *MAGNETOHYDRODYNAMICS; ELECTROCHEMISTRY; FUEL CELLS; PRIMARY BATTERIES; STORAGE BATTERIES; NUCLEAR ENERGY; *SOLAR ENERGY; *POWER SUPPLIES; SOLAR CELLS.)
NAVAL RESEARCH LAB.; WASHINGTON; D. C.
AD-274 070 62-3-1 DIV. 7

***SOLAR FLARES**

(*SATELLITE VEHICLES; SPACE PROBES; INSTRUMENTATION FOR MEASUREMENT OF *COSMIC RAYS, *SOLAR FLARES; SOLAR ENERGY; VAN ALLEN RADIATION BELT; *TERRESTRIAL MAGNETISM IN UPPER ATMOSPHERE; IONOSPHERE; SPACE ENVIRONMENTAL CONDITIONS.) ASTROPHYSICS; GEOPHYSICS.
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON; D. C.
AD-274 109 62-3-1 DIV. 2

(*SOLAR FLARES; STATISTICAL ANALYSIS.) SUNSPOTS.
AIR FORCE CAMBRIDGE RESEARCH LABS.; BEDFORD; MASS.
AD-274 212 62-3-1 DIV. 2

***SOLID ROCKET PROPELLANTS**

(*CONFERENCES ON *SOLID ROCKET PROPELLANTS; PROPELLANT GRAINS; *COMBUSTION; INSTABILITY; RESONANCE; JET ACOUSTIC OSCILLATIONS; PRESSURE.) (DETONATION; IGNITION; DECOMPOSITION.) BORON; MECHANICAL PROPERTIES; STRESSES; SHEAR STRESSES.
STANFORD RESEARCH INST.; MENLO PARK; CALIF.
AD-274 132 62-3-1 DIV. 10

(*SOLID ROCKET PROPELLANTS; ROCKET OXIDIZERS; ROCKET FUELS; BINDERS; PROPELLANT GRAINS; COMBUSTION; *DETONATION; *DETONATION WAVES; MATHEMATICAL ANALYSIS; EQUATIONS; COMPUTERS; THEORY.) (*TNT; DETONATION.) COMBUSTION CHAMBER GASES; PRESSURE; EQUATIONS OF STATE; VOLUME.
AERONUTRONIC; NEWPORT BEACH; CALIF.
AD-274 144 62-3-1 DIV. 10

(*SOLID ROCKET PROPELLANTS; DETERIORATION; VISCOSITY; STABILITY DURING STORAGE; TESTS; TEST METHODS; CHEMICAL ANALYSIS; MATHEMATICAL ANALYSIS; MATHEMATICAL PREDICTION; EQUATIONS.) FUEL ADDITIVES.
FELTMAN RESEARCH LABS.; PICATINNY ARSENAL; DOVER; N. J.
AD-274 308 62-3-1 DIV. 10

***SOLID STATE PHYSICS**

(*SOLID STATE PHYSICS; *INTERMETALLIC COMPOUNDS; ALLOYS; CRYSTALS; *SINGLE CRYSTALS; *SUPERCONDUCTORS; *MAGNETIC MATERIALS; FILMS, THIN FILMS; *SEMICONDUUCTORS, TRANSISTORS *LUMINESCENT MATERIALS; IMAGE CONVERTER TUBES; INFRARED IMAGE TUBES; MICROWAVE EQUIPMENT; ELECTRONIC EQUIPMENT.) (ELECTRICAL PROPERTIES; RESISTANCE; MAGNETIC EFFECTS; MAGNETIC PROPERTIES; PARAMAGNETIC RESONANCE; SURFACE PROPERTIES; PHOTOCONDUCTIVITY; MASS SPECTROSCOPY; POLAROGRAPHIC ANALYSIS; OPTICS; MICROWAVES; ANTIFERROMAGNETISM; PHONONS; NUCLEAR SPINS.)
LINCOLN LAB.; MASS. INST. OF TECH.; LEXINGTON.
AD-274 072 62-3-1 DIV. 25

***SOLIDS**

(*SOLIDS; *CRYSTALS; *CRYSTAL STRUCTURE; *QUANTUM MECHANICS; *CHEMICAL BONDS; ELECTRONS; SPIN; ATOMIC ORBITALS; THEORY.) SOLID STATE PHYSICS; VALENCE.
UPPSALA U. (SWEDEN).
AD-274 277 62-3-1 DIV. 25

***SOUND**

(*BIBLIOGRAPHY; *SOUND; *ACOUSTICS; AERODYNAMICS; HYDRODYNAMICS; FLUID MECHANICS.) (*NOISE; JET ACOUSTIC OSCILLATIONS; JET ENGINE NOISE; JET PLANE NOISE; PROPELLER NOISE.) (TURBULENCE; RESONANCE; SHOCK WAVES; SOUND TRANSMISSION.)
CALIFORNIA U.; LOS ANGELES; CALIF.
AD-274 208 62-3-1 DIV. 25

***SOUNDING ROCKETS**

(FLIGHT TESTING OF *SOUNDING ROCKETS FOR MEASUREMENT OF SOLAR WINDS; PROTONS BEYOND OUTER RADIATION BELT.) (ANALYSIS OF FLIGHT PATHS OF TEST VEHICLES; SUPERSONIC TEST VEHICLES.) (POSITION FINDING OF SOUNDING ROCKETS FROM TELEMETERING DATA.) (RADAR TRACKING; OPTICAL TRACKING OF *ROCKETS ON UPPER ATMOSPHERE.) PROTONS; *INTERSTELLAR MATTER; TELEMETER SYSTEMS.
AIR FORCE SPECIAL WEAPONS CENTER; KIRTLAND AIR FORCE BASE; N. MEX.
AD-274 086 62-3-1 DIV. 2

***SPACE CHARGES**

(*ELECTRON GUNS; THEORY; DESIGN; TESTS WITH *ELECTRON BEAMS ACROSS *MAGNETIC FIELDS; *ELECTRIC FIELDS.) (MICROWAVE EQUIPMENT; OPTICAL SYSTEMS.) ELECTRON BEAMS; STABILITY; *SPACE CHARGES; *FOCUSING; ELECTRODES; CATHODES (ELECTRON TUBES); *ELECTRON TUBES; MATHEMATICAL ANALYSIS; DIRECT CURRENT; MEASUREMENT.
MICROWAVE LAB.; STANFORD U.; CALIF.
AD-274 256 62-3-1 DIV. 9

***SPACE FLIGHT**

(*SPACE FLIGHT; *MANNED; *SCIENTIFIC RESEARCH; SPACE MEDICINE; BEHAVIOR; *HUMAN ENGINEERING; STRESS (PHYSIOLOGY); STRESS (PSYCHOLOGY).) (*COMPUTERS; LOGISTICS; COSTS.) (*PERSONNEL; SCIENTIFIC PERSONNEL; ENGINEERING PERSONNEL; TRAINING.) SPACE ENVIRONMENTAL CONDITIONS; SIMULATION.
CORNELL AERONAUTICAL LAB.; INC.; BUFFALO; N. Y.
AD-274 053 62-3-1 DIV. 12

***SPACE MEDICINE**

(*BIBLIOGRAPHY; *SPACE MEDICINE; *BIOLOGY.) (*PHYSIOLOGY; METABOLISM; NEUROLOGY; SENSORY PERCEPTION; PSYCHOLOGY; PSYCHIATRY; CLOSED-CYCLE ECOLOGICAL SYSTEMS; ASTROPHYSICS; MILITARY PERSONNEL; AVIATION PERSONNEL; PHARMACOLOGY; SAFETY; AIR SEA RESCUES.) SCIENCE AND TECH; DIV.; LIBRARY OF CONGRESS; WASHINGTON; D. C.
AD-274 044 62-3-1 DIV. 16

***SPACESHIPS**

(FUEL SYSTEMS; *PROPELLANT TANKS; PRESSURE CAPSULES FOR SPACE FLIGHT; *SATELLITE VEHICLES; *SPACESHIPS; SPACE ENVIRONMENTAL CONDITIONS; WEIGHTLESSNESS.) (MECHANICS; PISTONS; FUEL PUMPS; PUMPS; DIAPHRAGMS (MECHANICS); PNEUMATIC DEVICES; PRESSURE.) (CHEMISTRY; CHEMICAL ENGINEERING; DISPLACEMENT REACTIONS; SURFACE PROPERTIES.) (MAGNETISM; MAGNETOSTRICTION; ELECTROSTATICS; DIELECTRICS; ELECTRICAL EFFECTS.) (LIQUID ROCKET PROPELLANTS; ROCKET OXIDIZERS; ROCKET FUELS.) (MATERIALS; RADIATION EFFECTS, ACCELERATION; POROSITY; PHYSICAL PROPERTIES; ELASTICITY; MECHANICAL PROPERTIES; FATIGUE (MECHANICS); DEFORMATION.)
BELL AEROSYSTEMS CO.; BUFFALO; N. Y.
AD-274 048 62-3-1 DIV. 27

(*SYMPOSIA ON *THERMODYNAMICS; *SPACESHIPS; SPACE PROBES; SATELLITE VEHICLES.) (SURFACE PROPERTIES; *TEMPERATURE CONTROL; *THERMAL RADIATION; SOLAR ENERGY; ABSORPTION; REFLECTION; SPECTROGRAPHIC DATA; *SPECTROPHOTOMETERS; INFRARED SPECTROPHOTOMETERS; THERMOCOUPLES.)
LOCKHEED AIRCRAFT CORP.; SUNNYVALE; CALIF.
AD-274 052 62-3-1 DIV. 12

***SPARK MACHINING**

(METALS; *SPARK MACHINING; ELECTRIC DISCHARGES; THEORY; USSR.)
FOREIGN TECH. DIV.; AIR FORCE SYSTEMS COMMAND; WRIGHT-PATTERSON AIR FORCE BASE; OHIO.
AD-274 089 62-3-1 DIV. 26

***SPECTROGRAPHIC ANALYSIS**

(*SPECTROGRAPHIC ANALYSIS OF *CHEMICAL IMPURITIES IN *SEMICONDUCTORS.) (SEMICONDUCTORS; ARSENIDES; GALLIUM COMPOUNDS; ELECTRICAL PROPERTIES; CRYSTALLIZATION.) (PRODUCTION OF SEMICONDUCTORS.) VAPORIZATION.
GENERAL TELEPHONE AND ELECTRONICS LABS.; INC.; BAYSIDE; N. Y.
AD-273 969 62-3-1 DIV. 25

(*PHONONS; ELECTRONS; METALS; IONS; CONDUCTIVITY; LEAD; SODIUM; *RARE EARTHS; *SPECTROGRAPHIC ANALYSIS.)
CALIFORNIA U.; LA JOLLA.
AD-273 995 62-3-1 DIV. 25

(*PARAMAGNETIC RESONANCE; IONS; RARE EARTHS; CRYSTALS; CALCIUM COMPOUNDS; FLUORIDES; *SPECTROGRAPHIC ANALYSIS.)
HEBREW U. (ISRAEL).
AD-274 000 62-3-1 DIV. 25

(*AIR; *ELECTRON BOMBARDMENT; *SPECTROGRAPHIC ANALYSIS.) (ELECTRONS; SCATTERING; AIR; SECONDARY EMISSION.) SPECTROGRAPHIC DATA; *ELECTRON GUNS.
MARYLAND U.; COLLEGE PARK.
AD-274 250 62-3-1 DIV. 25

(*AURORAE; *SPECTROGRAPHIC ANALYSIS; MEASUREMENT; SPECTROPHOTOMETERS; HYDROGEN; RADIO SIGNALS; REFLECTION.) (*SKY BRIGHTNESS; SPECTROGRAPHIC ANALYSIS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON; D. C.
AD-274 326 62-3-1 DIV. 2

***SPECTROPHOTOMETERS**

(*SYMPOSIA ON *THERMODYNAMICS; *SPACESHIPS; SPACE PROBES; SATELLITE VEHICLES.) (SURFACE PROPERTIES; *TEMPERATURE CONTROL; *THERMAL RADIATION; SOLAR ENERGY; ABSORPTION; REFLECTION; SPECTROGRAPHIC DATA; *SPECTROPHOTOMETERS; INFRARED SPECTROPHOTOMETERS; THERMOCOUPLES.)
LOCKHEED AIRCRAFT CORP.; SUNNYVALE; CALIF.
AD-274 052 62-3-1 DIV. 12

***SPHERES**

(*FALLING BODIES; *SPHERES; MEASUREMENT OF ATMOSPHERE, DENSITY BY *RADAR TRACKING.) *ATMOSPHERIC SOUNDING.
AIR FORCE CAMBRIDGE RESEARCH LABS.; BEDFORD; MASS.
AD-274 213 62-3-1 DIV. 2

***STABILITY**

(*STABILITY OF RANDOM VARYING SYSTEMS; *PROBABILITY; VECTOR ANALYSIS; DIFFERENTIAL EQUATIONS; *STATISTICAL PROCESSES; DIFFERENCE EQUATIONS.) (INEQUALITIES; MATRIX ALGEBRA.)
ELECTRONICS RESEARCH LAB.; U. OF CALIF.; BERKELEY.
AD-274 308 62-3-1 DIV. 15

***STAINLESS STEEL**

(ALLOYS; *ALUMINUM ALLOYS; *MAGNESIUM ALLOYS; *TITANIUM ALLOYS; *STEEL; *STAINLESS STEEL; *NICKEL ALLOYS.) (PLASTICS; *EPOXY RESINS; *EXPANDED PLASTICS; *ACRYLIC RESINS.) (MECHANICAL PROPERTIES; ELECTRICAL PROPERTIES; PHYSICAL PROPERTIES; ELECTRICAL PROPERTIES; DATA; TABLES; INDEXES.)
REPUBLIC AVIATION CORP.; FARMINGDALE; N. Y.
AD-274 289 62-3-1 DIV. 17

(*STAINLESS STEEL (16CR-8NI-2MO); CHROMIUM ALLOYS; NICKEL ALLOYS; MOLYBDENUM ALLOYS; AUSTENITE; STEEL TUBING; STEAM PIPES; FORGING; WELDING; PROCESSING; PIPES.) (TENSILE PROPERTIES; IMPACT SHOCK; MICROSTRUCTURE; MAGNETIC PROPERTIES; CORROSION; CHEMICAL ANALYSIS; AGING; HEAT TREATMENT.)
BABCOCK AND WILCOX CO.; ALLIANCE; OHIO.
AD-274 371 62-3-1 DIV. 17

***STATIC ELECTRICITY**

(*HELICOPTERS; REDUCTION OF *STATIC ELECTRICITY BY *ELECTRIC DISCHARGES; ELECTRICAL CORONA; MATHEMATICAL ANALYSIS.) (HELICOPTERS, HAZARDS; *AVIATION SAFETY; ANALYSIS; COUNTERMEASURES.) (ATMOSPHERE; ATMOSPHERICS; ELECTRICAL PROPERTIES.)
PRINCETON U.; N. J.
AD-273 976 62-3-1 DIV. 1

***STATISTICAL DISTRIBUTIONS**

(COMPLEX VARIABLES; STATISTICAL FUNCTIONS; *STATISTICAL DISTRIBUTIONS; *PROBABILITY; COMBINATORIAL ANALYSIS.)
NORTHWESTERN U.; EVANSTON; ILL.
AD-274 019 62-3-1 DIV. 15

(*STATISTICAL DISTRIBUTIONS; DESIGN.) (MATRIX ALGEBRA; MATHEMATICAL LOGIC; POLYNOMIALS; VECTOR ANALYSIS.) (EXPERIMENTAL DATA; TABLES.)
ARMY SIGNAL RESEARCH AND DEVELOPMENT LAB.; FORT MONMOUTH; N. J.
AD-274 397 62-3-1 DIV. 15

***STATISTICAL PROCESSES**

(*RADIO SIGNALS; *DETECTION; SIGNAL-TO-NOISE RATIO; CORRELATION TECHNIQUES.) (*STATISTICAL PROCESSES; PROBABILITY; STATISTICAL ANALYSIS; MATRIX ALGEBRA; INTEGRAL TRANSFORMS; *STATISTICAL TESTS.)
BROWN U. DIV. OF APPLIED MATHEMATICS; PROVIDENCE; R. I.
AD-274 202 62-3-1 DIV. 6

(*STATISTICAL PROCESSES IN SYNTHESIS OF *LINEAR SYSTEMS, NOISE.) (PROBABILITY; STATISTICAL FUNCTIONS; STATISTICAL DISTRIBUTIONS; MATRIX ALGEBRA; DIFFERENTIAL EQUATIONS; LEAST SQUARES METHOD; MATHEMATICAL PREDICTION.) THESES.
CALIFORNIA U.; LOS ANGELES.
AD-274 207 62-3-1 DIV. 15

(*STABILITY OF RANDOM VARYING SYSTEMS; *PROBABILITY; VECTOR ANALYSIS; DIFFERENTIAL EQUATIONS; *STATISTICAL PROCESSES; DIFFERENCE EQUATIONS.) (INEQUALITIES; MATRIX ALGEBRA.)
ELECTRONICS RESEARCH LAB.; U. OF CALIF.; BERKELEY.
AD-274 308 62-3-1 DIV. 15

(•DATA PROCESSING SYSTEMS• EFFECTIVENESS• •RELIABILITY•) (•STATISTICAL PROCESSES• •TIME• PROBABILITY•)
DAVID TAYLOR MODEL BASIN• WASHINGTON• D. C•
AD-274 350 62-3-1 DIV. 30

•STATISTICAL TESTS

(•RADIO SIGNALS• •DETECTION• SIGNAL-TO-NOISE RATIO• CORRELATION TECHNIQUES•) (•STATISTICAL PROCESSES• PROBABILITY• STATISTICAL ANALYSIS• MATRIX ALGEBRA• INTEGRAL TRANSFORMS• •STATISTICAL TESTS•)
BROWN U• DIV• OF APPLIED MATHEMATICS• PROVIDENCE R• I•
AD-274 302 62-3-1 DIV. 6

•STEEL

(•STEEL 4140• 4330• 4325• 4340• 1040• METALLURGY• PROCESSING• PURIFICATION• MELTING• ELECTRIC ARCS• SOLUTIONS• SLAGS• SEPARATION• PHOSPHORUS• SULPHUR• PHASE STUDIES• THEORY•) TABLES•
WATERTOWN ARSENAL LABS•• MASS•
AD-274 278 62-3-1 DIV. 17

(METALS• •ALUMINUM• •TITANIUM ALLOYS• •ALUMINUM ALLOYS• VANADIUM ALLOYS• •STEEL• STAINLESS STEEL• MACHINING• •EXTRUSION• EXPLOSIVE FORMING• MANUFACTURING METHODS• FEASIBILITY STUDIES•) (TOOLS• MACHINE TOOLS• DIES• DESIGN• INSTRUMENTATION•) AIRFRAMES• AIRCRAFT• GUIDED MISSILES• SPACESHIPS• ALLOYS•
WESTINGHOUSE ELECTRIC CORP•• BLAIRSVILLE• PA•
AD-274 281 62-3-1 DIV. 26

(ALLOYS• •ALUMINUM ALLOYS• •MAGNESIUM ALLOYS• •TITANIUM ALLOYS• •STEEL• •STAINLESS STEEL• •NICKEL ALLOYS•) (PLASTICS• •EPOXY RESINS• •EXPANDED PLASTICS• •ACRYLIC RESINS•) (MECHANICAL PROPERTIES• ELECTRICAL PROPERTIES• PHYSICAL PROPERTIES• ELECTRICAL PROPERTIES• DATA• TABLES• INDEXES•)
REPUBLIC AVIATION CORP•• FARMINGDALE• N• Y•
AD-274 289 62-3-1 DIV. 17

(HYDROSTATIC PRESSURE• •EXTRUSION• •STEEL• •TITANIUM ALLOYS• ALUMINUM ALLOYS• VANADIUM ALLOYS•) (•MACHINE TOOLS• HYDRAULIC PRESSES• DESIGN•) (HIGH PRESSURE RESEARCH• •DIES• HYDRAULIC FLUIDS• HYDRAULIC SEALS• METAL SEALS• RUBBER SEALS•) (STRESSES• MATHEMATICAL ANALYSIS• SHEAR STRESSES•)
BATTELLE MEMORIAL INST•• COLUMBUS•
AD-274 372 62-3-1 DIV. 26

•STIFFENED CYLINDERS

(•STIFFENED CYLINDERS• •BUCKLING• TEMPERATURE• THERMAL STRESSES• STRESSES• LOAD DISTRIBUTION• THERMAL EXPANSION• THEORY• MATHEMATICAL ANALYSIS• MATHEMATICAL PREDICTION•) CYLINDRICAL BODIES• AERODYNAMIC HEATING•
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION• WASHINGTON• D• C•
AD-274 326 62-3-1 DIV. 25

•STORMS

(PACIFIC OCEAN• •STORMS• CYCLONES• RADAR ANALYSIS• •METEOROLOGICAL RADAR•) (WASHINGTON• METEOROLOGICAL DATA•)
WASHINGTON U•• SEATTLE•
AD-274 033 62-3-1 DIV. 2

•STRESSES

(•STRESSES• SURFACES• •CYLINDRICAL BODIES• PRESSURE• VISCOSITY• ELASTIC SHELLS•) (DIGITAL COMPUTERS• COMPUTER LOGIC•)
COLUMBIA U•• NEW YORK•
AD-274 046 62-3-1 DIV. 25

•STRONTIUM COMPOUNDS

(•FERROELECTRIC MATERIALS• •FERROELECTRIC CRYSTALS• •STRONTIUM COMPOUNDS• •BARIUM COMPOUNDS• •TITANATES• IMPURITIES OF RARE EARTH ELEMENTS SUCH AS GADOLINIUM• IONS• MICROWAVE SPECTROSCOPY• PARAMAGNETIC RESONANCE• NUCLEAR SPINS• TEMPERATURE• PHASE TRANSITIONS• SPECTROGRAPHIC ANALYSIS• REFRACTIVE PROPERTIES•)
RAYTHEON CO•• WALTHAM• MASS•
AD-273 981 62-3-1 DIV. 25

•SULFIDES

(•PHOSPHORS• •ZINC COMPOUNDS• •SULFIDES• POWDERS• •LUMINESCENT MATERIALS• •LUMINESCENCE• •PHOTOEMISSION• EXCITATION• VOLTAGE• SOLID STATE PHYSICS• THEORY•)
DIELECTRICS•
NATIONAL ELECTROTECHNICAL INST• (ITALY)•
AD-273 963 62-3-1 DIV. 25

(MIXTURES• •HYDROCARBONS• •GLASS• •LOW TEMPERATURE RESEARCH• FREEZING• PHYSICAL PROPERTIES• VISCOSITY• MELTING•) (PENTANES• HEXANES• CYCLOHEXANES•) (ALKYL RADICALS• •SULFIDES• •THIOLS• •IODINE• ETHYL RADICALS• HYDROGEN COMPOUNDS• •IODIDES• ORGANIC SOLVENTS• HYDROCARBONS• •PHOTOLYSIS• PHOTOCHEMICAL REACTIONS•)
LUND U• (SWEDEN)•
AD-274 160 62-3-1 DIV. 4

(ORGANIC COMPOUNDS• ALKYL RADICALS• •SULFIDES• •THIOLS• PHOTOLYSIS• •DISSOCIATION• CHEMICAL BONDS• ENERGY• REACTION KINETICS• CHEMICAL REACTIONS• •RECOMBINATION REACTIONS• DISPROPORTIONATION• THERMOCHEMISTRY• •FREE RADICALS•) PHOTOCHEMICAL REACTIONS• SPECTROGRAPHIC ANALYSIS• LOW TEMPERATURE RESEARCH•
LUND U• (SWEDEN)•
AD-274 252 62-3-1 DIV. 4

•SUPERAERODYNAMICS

(•SUPERAERODYNAMICS• •DRAG OF AIRFOILS IN SUPERSONIC FLOW• GASES• DISSOCIATION•) (THERMODYNAMICS• EQUATIONS OF STATE• CHEMICAL EQUILIBRIUM• ENTROPY•)
RENSSELAER POLYTECHNIC INST•• TROY• N• Y•
AD-274 317 62-3-1 DIV. 25

(•SHEETS AND •CYLINDRICAL BODIES• •DRAG IN A •SUPERSONIC FLOW• •CONTINUUM MECHANICS• •MOLECULES• GAS FLOW• VISCOSITY•) (HEAT TRANSFER• •SUPERAERODYNAMICS• MACH NUMBER•)
INSTITUTE OF ENGINEERING RESEARCH• U• OF CALIF••
BERKELEY•
AD-274 385 62-3-1 DIV. 9

•SUPERCONDUCTORS

(•SUPERCONDUCTORS• THIN FILMS• PRODUCTION• MANUFACTURING METHODS BY •VAPOR PLATING• •METAL COATINGS OF METAL FILMS• LEAD• TIN AND •PLASTIC COATINGS• POLYMERS• SILICONES• ELECTRIC INSULATION•) LOW TEMPERATURERESEARCH LOW PRESSURE RESEARCH• ELECTRONIC EQUIPMENT• CIRCUITS•
SPACE TECHNOLOGY LABS•• INC•• LOS ANGELES• CALIF•
AD-274 030 62-3-1 DIV. 8

•SUPERHIGH FREQUENCY FILTERS

(•WAVEGUIDE FILTERS• •BAND-PASS FILTERS• •SUPERHIGH FREQUENCY FILTERS• WAVEGUIDE COUPLERS• RADIOFREQUENCY FILTERS• X BAND• DESIGN•) (WAVEGUIDES• COUPLING CIRCUITS• TUNING DEVICES• PHASE SHIFTERS• MATHEMATICAL ANALYSIS•) (ELECTRICAL PROPERTIES• RESONANCE• STANDING WAVE RATIOS• MEASUREMENT•)
DIAMOND ORDNANCE FUZE LABS•• WASHINGTON• D• C•
AD-274 147 62-3-1 DIV. 8

•SUPERSONIC DIFFUSERS

(•SUPERSONIC WIND TUNNELS• DESIGN•) (•SUPERSONIC DIFFUSERS• •INJECTORS• CONFIGURATION• FEASIBILITY STUDIES• EFFECTIVENESS• PRESSURE•)
ARNOLD ENGINEERING DEVELOPMENT CENTER• ARNOLD AIR FORCE STATION• TENN•
AD-274 219 62-3-1 DIV. 30

•SUPERSONIC FLOW

(•MAGNETOHYDRODYNAMICS• •FLUID FLOW•) (MAGNETIC FIELDS• VECTOR ANALYSIS• INCOMPRESSIBLE FLOW OR •SUPERSONIC FLOW IN SHOCK TUBES•) (•PERTURBATION THEORY• PARTIAL DIFFERENTIAL EQUATIONS•
AVCO EVERETT RESEARCH LAB•• MASS•
AD-274 288 62-3-1 DIV. 25

(•SHEETS AND •CYLINDRICAL BODIES• •DRAG IN A •SUPERSONIC FLOW• •CONTINUUM MECHANICS• •MOLECULES• GAS FLOW• VISCOSITY•) (HEAT TRANSFER• •SUPERAERODYNAMICS• MACH NUMBER•)
INSTITUTE OF ENGINEERING RESEARCH• U• OF CALIF••
BERKELEY•
AD-274 385 62-3-1 DIV. 9

•SUPERSONIC WIND TUNNELS

(•SUPERSONIC WIND TUNNELS• DESIGN•) (•SUPERSONIC DIFFUSERS• •INJECTORS• CONFIGURATION• FEASIBILITY STUDIES• EFFECTIVENESS• PRESSURE•)
ARNOLD ENGINEERING DEVELOPMENT CENTER• ARNOLD AIR FORCE STATION• TENN•
AD-274 219 62-3-1 DIV. 30

•SUPPRESSORS

(TESTS• EFFECTIVENESS• •SUPPRESSORS• •JET ENGINE NOISE• ACOUSTIC INSULATION• SOUND• PRESSURE• SOUND TRANSMISSION• TEST FACILITIES•)
BOLT• BERANEK• AND NEWMAN• INC•• CAMBRIDGE• MASS•
AD-273 987 62-3-1 DIV. 30

•SWEPT-BACK WINGS

(•SWEPTBACK WINGS• SEMISPAN MODELS• WIND TUNNEL MODELS• PITCHING• STABILITY (LONGITUDINAL)• GUST LOADS• LOAD DISTRIBUTION• PRESSURE• REYNOLDS NUMBER• AERODYNAMICS• MODEL TESTS•)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION• WASHINGTON• D• C••
AD-274 330 62-3-1 DIV. 9

•SWITCHING CIRCUITS

(FREQUENCY MODULATION• •INVERTER CIRCUITS• DESIGN• RECTIFIERS FOR •POWER SUPPLIES• DIRECT CURRENT•) (POWER• •MODULATORS• •SWITCHING CIRCUITS• ELECTRONIC SWITCHES•) (SILICONES• SEMICONDUCTORS• RESISTORS• NONLINEAR SYSTEMS• SOLID STATE PHYSICS• ELECTRONIC CIRCUITS•)
ADVANCED ELECTRONICS CENTER• GENERAL ELECTRIC CO•• ITHACA• N• Y•
AD-274 051 62-3-1 DIV. 7

•SYMPOSIA

(•SHOCK TUBES• •SYMPOSIA•) (INSTRUMENTATION• OPERATION AND CONSTRUCTION OF SHOCK TUBES•) HYPERSONIC WIND TUNNELS•
BALLISTIC RESEARCH LABS•• ABERDEEN PROVING GROUND• MD•
AD-274 039 62-3-1 DIV. 30

(•SYMPOSIA ON •THERMODYNAMICS• •SPACESHIPS• SPACE PROBES• SATELLITE VEHICLES•) (SURFACE PROPERTIES• •TEMPERATURE CONTROL• •THERMAL RADIATION• SOLAR ENERGY• ABSORPTION• REFLECTION• SPECTROGRAPHIC DATA• •SPECTROPHOTOMETERS• INFRARED SPECTROPHOTOMETERS• THERMOCOUPLES•)
LOCKHEED AIRCRAFT CORP••• SUNNYVALE• CALIF•
AD-274 082 62-3-1 DIV. 12

(•SYMPOSIA• •GEOPHYSICS•) (MEASUREMENT OF PHYSICAL PROPERTIES WITH RESPECT TO EARTH BY SPECTROGRAPHIC ANALYSIS OF ELECTROMAGNETIC WAVES•)
INSTITUTE OF SCIENCE AND TECH•• U• OF MICHIGAN• ANN ARBOR•
AD-274 155 62-3-1 DIV. 2

(MATHEMATICAL PREDICTION• EQUATIONS FOR HEAT• SOLAR ENERGY• ALBEDO (ASTRONOMY)• HEAT PRODUCTION• THERMAL RADIATION• SPACE ENVIRONMENTAL CONDITIONS• •THERMODYNAMICS OF •SATELLITE VEHICLES IN ORBITAL FLIGHT PATHS•) (GUIDED MISSILE BATTERIES• ELECTRICAL EQUIPMENT• HEAT PRODUCTION•) (•TEMPERATURE CONTROL• RADIATORS• PAINTS• HEAT TRANSFER• HEAT EXCHANGERS•) •SYMPOSIA•
LOCKHEED AIRCRAFT CORP••• SUNNYVALE• CALIF•
AD-274 101 62-3-1 DIV. 12

(•SATELLITE VEHICLES• SPACE ENVIRONMENTAL CONDITIONS• THERMAL RADIATION• SOLAR ENERGY• HEAT• HEAT PRODUCTION• •THERMODYNAMICS•) (•TEMPERATURE CONTROL OF SURFACES BY ABSORPTION• REFLECTION• HEAT TRANSFER• RADIATORS• PAINTS•) (RADIATION EFFECTS ON MATERIALS•) •SYMPOSIA•
LOCKHEED AIRCRAFT CORP••• SUNNYVALE• CALIF•
AD-274 102 62-3-1 DIV. 12

•SYNTHESIS

(•ELECTRICAL NETWORKS• •SYNTHESIS• REFLECTION• POLYNOMIALS•) (RESISTORS• CAPACITORS•)
ELECTRONICS RESEARCH LAB•• U• OF CALIF••
BERKELEY•
AD-274 306 62-3-1 DIV. 7

•SYNTHETIC FIBERS

(•ROCKET CASES• •FILAMENT WOUND CONSTRUCTION• MATERIALS• FIBERS• •SYNTHETIC FIBERS• FILAMENTS• GLASS TEXTILES• IMPREGNATION• COATINGS• RESINS• HEAT RESISTANT POLYMERS•) HYDROSTATIC PRESSURE• HIGH PRESSURE RESEARCH• HIGH TEMPERATURE RESEARCH• TENSILE PROPERTIES• FAILURE (MECHANICS)• TESTS•
AEROJET-GENERAL CORP••• AZUSA• CALIF•
AD-273 991 62-3-1 DIV. 27

(GLIDERS• RE-ENTRY VEHICLES• STRUCTURES• MATERIALS•) (•TEXTILES• •METALLIC TEXTILES• WIRE• NICKEL ALLOYS (RENE 41)• COBALT ALLOYS• •SYNTHETIC FIBERS• DACRON• NYLON THREAD• NYLON• THREADS• •INDUSTRIAL EQUIPMENT• •MACHINES• DESIGN• SPECIFICATIONS•)
GOODYEAR AIRCRAFT CORP••• AKRON• OHIO•
AD-274 309 62-3-1 DIV. 14

•TARGETS

(•HYPERVELOCITY PROJECTILES• BALLISTICS• VELOCITY• TERMINAL BALLISTICS• STATISTICAL FUNCTIONS• COMPLEX VARIABLES• DIGITAL COMPUTERS•) •TARGETS• CRATERING• DENSITY• STRESSES• TENSILE PROPERTIES• FRACTURE (MECHANICS)• TEMPERATURE• HARDNESS• PENETRATION• MEASUREMENT• MATHEMATICAL PREDICTION•
HAYES INTERNATIONAL CORP••• BIRMINGHAM• ALA•
AD-273 990 62-3-1 DIV. 22

•TELEMETERING ANTENNAS

(RADAR RECEIVERS• RADIO RECEIVERS• •TELEMETERING ANTENNAS• PARABOLIC ANTENNAS• •COUPLED ANTENNAS• DESIGN• COSTS•) (•TELEMETERING RECEIVERS• •COMMUNICATION EQUIPMENT• GROUND SUPPORT EQUIPMENT FOR SPACE PROBES•) (RADIO SIGNALS• SIGNAL-TO-NOISE RATIO• FREQUENCY MODULATION•)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION• WASHINGTON• D• C•
AD-274 168 62-3-1 DIV. 8

***TELEMETERING RECEIVERS**

(RADAR RECEIVERS; RADIO RECEIVERS; *TELEMETERING ANTENNAS; PARABOLIC ANTENNAS; *COUPLED ANTENNAS; DESIGN; COSTS.) (*TELEMETERING RECEIVERS; *COMMUNICATION EQUIPMENT; GROUND SUPPORT EQUIPMENT FOR SPACE PROBES.) (RADIO SIGNALS; SIGNAL-TO-NOISE RATIO; FREQUENCY MODULATION.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON; D. C.
AD-274 168 62-3-1 DIV. 9

***TEMPERATURE CONTROL**

(*SYMPOSIA ON *THERMODYNAMICS; *SPACESHIPS; SPACE PROBES; SATELLITE VEHICLES.) (SURFACE PROPERTIES; *TEMPERATURE CONTROL; *THERMAL RADIATION; SOLAR ENERGY; ABSORPTION; REFLECTION; SPECTROGRAPHIC DATA; *SPECTROPHOTOMETERS; INFRARED SPECTROPHOTOMETERS; THERMOCOUPLES.)
LOCKHEED AIRCRAFT CORP.; SUNNYVALE; CALIF.
AD-274 052 62-3-1 DIV. 12

(MATHEMATICAL PREDICTION; EQUATIONS FOR HEAT; SOLAR ENERGY; ALBEDO (ASTRONOMY); HEAT PRODUCTION; THERMAL RADIATION; SPACE ENVIRONMENTAL CONDITIONS; *THERMODYNAMICS OF *SATELLITE VEHICLES IN ORBITAL FLIGHT PATHS.) (GUIDED MISSILE BATTERIES; ELECTRICAL EQUIPMENT; HEAT PRODUCTION.) (*TEMPERATURE CONTROL; RADIATORS; PAINTS; HEAT TRANSFER; HEAT EXCHANGERS.) *SYMPOSIA.
LOCKHEED AIRCRAFT CORP.; SUNNYVALE; CALIF.
AD-274 101 62-3-1 DIV. 12

(*SATELLITE VEHICLES; SPACE ENVIRONMENTAL CONDITIONS; THERMAL RADIATION; SOLAR ENERGY; HEAT; HEAT PRODUCTION; *THERMODYNAMICS.) (*TEMPERATURE CONTROL OF SURFACES BY ABSORPTION; REFLECTION; HEAT TRANSFER; RADIATORS; PAINTS.) (RADIATION EFFECTS ON MATERIALS.) *SYMPOSIA.
LOCKHEED AIRCRAFT CORP.; SUNNYVALE; CALIF.
AD-274 162 62-3-1 DIV. 12

***TERMINAL BALLISTICS**

(*TERMINAL BALLISTICS; DYNAMICS OF SMALL ARMS; PROJECTILES; ARMOR PIERCING AMMUNITION AND FRAGMENTATION AMMUNITION.) (DESIGN OF ARMOR; GRILLES FOR ARMORED VEHICLES.) PENETRATION OF PROJECTILES IN STEEL; ALUMINUM; TITANIUM; ARMOR PLATE.
DENVER RESEARCH INST.; COLO.
AD-274 128 62-3-1 DIV. 22

***TERRESTRIAL MAGNETISM**

(*SATELLITE VEHICLES; SPACE PROBES; INSTRUMENTATION FOR MEASUREMENT OF *COSMIC RAYS; *SOLAR FLARES; SOLAR ENERGY; VAN ALLEN RADIATION BELT; *TERRESTRIAL MAGNETISM IN UPPER ATMOSPHERE; IONOSPHERE; SPACE ENVIRONMENTAL CONDITIONS.) ASTROPHYSICS; GEOPHYSICS.
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON; D. C.
AD-274 169 62-3-1 DIV. 2

(*TERRESTRIAL MAGNETISM; MEASUREMENT.) (*FLUXMETERS; MAGNETIC AMPLIFIERS; AUDIOFREQUENCY; AUDIOFREQUENCY OSCILLATORS; TIMING CIRCUITS; CALIBRATION; ELECTRONIC CIRCUITS; DETECTORS.) (TERRESTRIAL MAGNETISM; METEORS.)
DENVER RESEARCH INST.; COLO.
AD-274 380 62-3-1 DIV. 2

***TEST FACILITIES**

(TEST SETS; TEST EQUIPMENT; TEST METHODS; *TEST FACILITIES, MILITARY EQUIPMENT; *ELECTRONIC EQUIPMENT; INSTRUMENTATION; DESIGN.) (*CIRCUIT TESTERS; PRINTED CIRCUITS; *ELECTRONIC CIRCUITS; TUNED AMPLIFIERS; PREAMPLIFIERS; SIGNAL-TO-NOISE RATIO; TEST EQUIPMENT; TESTS.) (FIELD WIRE COMMUNICATION SYSTEMS; SIDEBANDS; SIGNAL GENERATORS; *PHASE SHIFTERS; BROADBAND MODULATORS; HALL EFFECT.) ELECTRICAL PROPERTIES; DETERMINATION.
ARMOUR RESEARCH FOUNDATION; CHICAGO; ILL.
AD-274 285 62-3-1 DIV. 30

***TEXTBOOKS**

(*ELECTRONICS; *TEXTBOOKS; USSR.) (ELECTRON TUBES; AMPLIFIERS; RADIO RECEIVERS; RADIO TRANSMITTERS.) (ELECTRON TUBES; SUPERHIGH FREQUENCY.) ELECTRONS; THEORY; *ELECTRON OPTICS; THERMIONIC EMISSION; PHOTOEMISSION; *CATHODES; OXIDE CATHODES; *DIODES; *TRIODES; TETRODES; PENTODES; *ELECTRON TUBES; FREQUENCY CONVERTERS; *SEMICONDUCTORS; *CATHODE RAY TUBES; KLYSTRONS; MAGNETRONS; TRAVELING WAVE TUBES; *PHOTOTUBES; PHOTOMULTIPLIERS; X RAYS; ELECTRON TUBES.
FOREIGN TECH. DIV.; AIR FORCE SYSTEMS COMMAND; WRIGHT-PATTERSON AIR FORCE BASE; OHIO.
AD-274 063 62-3-1 DIV. 8

***TEXTILES**

(GLIDERS; RE-ENTRY VEHICLES; STRUCTURES; MATERIALS.) (*TEXTILES; *METALLIC TEXTILES; WIRE; NICKEL ALLOYS (RENE 41); COBALT ALLOYS; *SYNTHETIC FIBERS; DACRON; NYLON THREAD; NYLON; THREADS; *INDUSTRIAL EQUIPMENT; *MACHINES; DESIGN; SPECIFICATIONS.)
GOODYEAR AIRCRAFT CORP.; AKRON; OHIO.
AD-274 309 62-3-1 DIV. 14

***THEORY**

(*THERMODYNAMICS; *THEORY OF *ELASTICITY; VISCOSITY; *RELAXATION TIME.) (*IRREVERSIBLE PROCESSES; MATRIX ALGEBRA; INTEGRAL TRANSFORMS.)
NORTH CAROLINA STATE COLL.; RALEIGH.
AD-274 248 62-3-1 DIV. 25

***THERMAL INSULATION**

(*ROCKET MOTOR NOZZLES; ROCKET MOTORS; SOLID ROCKET PROPELLANTS; *REFRACTORY MATERIALS; CERAMIC MATERIALS; *THERMAL INSULATION; THERMAL CONDUCTIVITY; *HEAT TRANSFER; TEMPERATURE; COMBUSTION CHAMBER GASES; PRESSURE; DESIGN; DEPOSITS.) TUNGSTEN; GRAPHITE; CARBIDES; PLASTICS; PHENOLIC RESINS; ASBESTOS FIBER; STEEL.
AEROJET-GENERAL CORP.; SACRAMENTO; CALIF.
AD-274 140 62-3-1 DIV. 27

(ROCKET CASES; COMBUSTION CHAMBER LINERS FOR SOLID ROCKET PROPELLANTS; *THERMAL INSULATION; POLYMERS; *HEAT RESISTANT POLYMERS.) (SYNTHESIS BY COPOLYMERIZATION; VINYL RADICALS; *METALORGANIC COMPOUNDS; *SILICON COMPOUNDS; *TIN COMPOUNDS; *TITANIUM COMPOUNDS; *CHELATE COMPOUNDS; PROCESSING; AGING WITH CATALYSTS.)
HUGHES AIRCRAFT CO.; CULVER CITY; CALIF.
AD-274 393 62-3-1 DIV. 27

***THERMAL RADIATION**

(CRAZING OF GLASS BY ELECTROMAGNETIC WAVES AND *THERMAL RADIATION FROM EXPLODING WIRES.) (EXPLOSIONS; WIRE.) (*THERMAL STRESSES; HEAT.) *RADIATION EFFECTS.
SPACE SCIENCES LAB.; GENERAL ELECTRIC CO.; PHILADELPHIA; PA.
AD-273 970 62-3-1 DIV. 25

(*SYMPOSIA ON *THERMODYNAMICS; *SPACESHIPS; SPACE PROBES; SATELLITE VEHICLES.) (SURFACE PROPERTIES; *TEMPERATURE CONTROL; *THERMAL RADIATION; SOLAR ENERGY; ABSORPTION; REFLECTION; SPECTROGRAPHIC DATA; *SPECTROPHOTOMETERS; INFRARED SPECTROPHOTOMETERS; THERMOCOUPLES.)
LOCKHEED AIRCRAFT CORP.; SUNNYVALE; CALIF.
AD-274 052 62-3-1 DIV. 12

***THERMAL STRESSES**

(CRAZING OF GLASS BY ELECTROMAGNETIC WAVES AND *THERMAL RADIATION FROM EXPLODING WIRES.) (EXPLOSIONS; WIRE.) (*THERMAL STRESSES; HEAT.) *RADIATION EFFECTS.
SPACE SCIENCES LAB.; GENERAL ELECTRIC CO.; PHILADELPHIA; PA.
AD-273 970 62-3-1 DIV. 25

(*GRAPHITE; SHEETS; HIGH TEMPERATURE RESEARCH; *THERMAL STRESSES; THERMAL EXPANSION; MEASUREMENT; DEFORMATION; MECHANICAL PROPERTIES; ELASTICITY; TEMPERATURE; STRESSES; MATHEMATICAL ANALYSIS.) (HEATING; TEST EQUIPMENT; STRAIN GAGES; OPTICAL INSTRUMENTS; EXTENSOMETERS; COLLIMATORS; AERODYNAMIC HEATING; SIMULATION.) RE-ENTRY VEHICLES; MATERIALS; STRUCTURES.
INSTITUTE OF ENGINEERING RESEARCH; U. OF CALIF.; BERKELEY.
AD-274 378 62-3-1 DIV. 14

***THERMOCOUPLES**

(*RADIOMETERS; SUN; ATMOSPHERE; HEAT.) (*THERMOCOUPLES; SILVER WIRE; BISMUTH WIRE.) VARNISHES; *RECORDING DEVICES; SOLAR SPECTRUM.
ARMY SIGNAL RESEARCH AND DEVELOPMENT LAB.; FORT MONMOUTH; N. J.
AD-274 298 62-3-1 DIV. 30

***THERMODYNAMICS**

(*SYMPOSIA ON *THERMODYNAMICS; *SPACESHIPS; SPACE PROBES; SATELLITE VEHICLES.) (SURFACE PROPERTIES; *TEMPERATURE CONTROL; *THERMAL RADIATION; SOLAR ENERGY; ABSORPTION; REFLECTION; SPECTROGRAPHIC DATA; *SPECTROPHOTOMETERS; INFRARED SPECTROPHOTOMETERS; THERMOCOUPLES.)
LOCKHEED AIRCRAFT CORP.; SUNNYVALE; CALIF.
AD-274 052 62-3-1 DIV. 12

(*AVIATION FUELS; *JET ENGINE FUELS; *HANDBOOKS; USSR; THERMOCHEMISTRY; HEAT; *THERMODYNAMICS; VISCOSITY; DENSITY; SURFACE TENSION; VAPORIZATION; THERMAL CONDUCTIVITY; PHYSICAL PROPERTIES; TEST METHODS; TEST EQUIPMENT; TESTS.) KEROSENE; GASOLINE; HEPTANES; HYDROCARBONS.
FOREIGN TECH. DIV.; AIR FORCE SYSTEMS COMMAND; WRIGHT-PATTERSON AIR FORCE BASE; OHIO.
AD-274 118 62-3-1 DIV. 10

(MATHEMATICAL PREDICTION; EQUATIONS FOR HEAT; SOLAR ENERGY; ALBEDO (ASTRONOMY); HEAT PRODUCTION; THERMAL RADIATION; SPACE ENVIRONMENTAL CONDITIONS; *THERMODYNAMICS OF *SATELLITE VEHICLES IN ORBITAL FLIGHT PATHS.) (GUIDED MISSILE BATTERIES; ELECTRICAL EQUIPMENT; HEAT PRODUCTION.) (*TEMPERATURE CONTROL; RADIATORS; PAINTS; HEAT TRANSFER; HEAT EXCHANGERS.) *SYMPOSIA.
LOCKHEED AIRCRAFT CORP.; SUNNYVALE; CALIF.
AD-274 101 62-3-1 DIV. 12

(*SATELLITE VEHICLES; SPACE ENVIRONMENTAL CONDITIONS; THERMAL RADIATION; SOLAR ENERGY; HEAT; HEAT PRODUCTION; *THERMODYNAMICS.) (*TEMPERATURE CONTROL OF SURFACES BY ABSORPTION; REFLECTION; HEAT TRANSFER; RADIATORS; PAINTS.) (RADIATION EFFECTS ON MATERIALS.) *SYMPOSIA.
LOCKHEED AIRCRAFT CORP.; SUNNYVALE; CALIF.
AD-274 162 62-3-1 DIV. 12

(*GASES; DISSOCIATION.) (*LOW TEMPERATURE RESEARCH; MOLECULES; ENTROPY; SPECIFIC HEAT.) (*THERMODYNAMICS; ANALYSIS.) DIFFERENTIAL EQUATIONS.
AEROSPACE CORP.; EL SEGUNDO; CALIF.
AD-274 222 62-3-1 DIV. 9

(*THERMODYNAMICS; *THEORY OF *ELASTICITY; VISCOSITY; *RELAXATION TIME.) (*IRREVERSIBLE PROCESSES; MATRIX ALGEBRA; INTEGRAL TRANSFORMS.)
NORTH CAROLINA STATE COLL.; RALEIGH.
AD-274 248 62-3-1 DIV. 25

***THERMOELECTRICITY**

(*BIBLIOGRAPHY; *THERMOELECTRICITY; GENERATORS; MATERIALS; RADIATION EFFECTS; RELIABILITY; *FAILURE (MECHANICS); AGING.) (*RADIOACTIVE BATTERIES; NUCLEAR POWER PLANTS; NUCLEAR ENERGY; SELENIUM; TELLURIUM; REACTOR FUELS; TELLURIUM COMPOUNDS.)
LOCKHEED AIRCRAFT CORP.; SUNNYVALE; CALIF.
AD-273 983 62-3-1 DIV. 7

(*BIBLIOGRAPHY; ENERGY.) (*THERMOELECTRICITY; THERMIONIC EMISSION; PHOTOEMISSION; PHOTOELECTRIC CELLS; *MAGNETOHYDRODYNAMICS; ELECTROCHEMISTRY; FUEL CELLS; PRIMARY BATTERIES; STORAGE BATTERIES; NUCLEAR ENERGY; *SOLAR ENERGY; *POWER SUPPLIES; SOLAR CELLS.)
NAVAL RESEARCH LAB.; WASHINGTON; D. C.
AD-274 070 62-3-1 DIV. 7

(*THERMOELECTRICITY; *GENERATORS; ELECTRIC POWER PRODUCTION; POWER SUPPLIES; DESIGN.) (THERMOCOUPLES OF CARBON; MOLYBDENUM; TUNGSTEN; MANUFACTURING METHODS; TESTS.) RESISTANCE.
MONSANTO RESEARCH CORP.; DAYTON; OHIO.
AD-274 184 62-3-1 DIV. 7

(*GENERATORS; AUXILIARY POWER PLANTS; *THERMOELECTRICITY; *ISOTOPES; HEAT TRANSFER; HEAT EXCHANGERS; COOLING; MANUFACTURING METHODS.) (POWER PLANTS; POWER SUPPLIES; *ELECTRIC POWER PRODUCTION; *NUCLEAR POWER PLANTS; THERMAL CONDUCTIVITY; THERMOCOUPLES; IMPEDANCE MATCHING; TESTS.)
WESTINGHOUSE ELECTRIC CORP.; CHESWICK; PA.
AD-274 280 62-3-1 DIV. 7

***THERMONUCLEAR EXPERIMENTS**

(*UNDERGROUND STRUCTURES; SOILS; AIR BLAST; LOAD DISTRIBUTION; *THERMONUCLEAR EXPERIMENTS; MODEL TESTS; DYNAMICS; SIMULATION; MATHEMATICAL ANALYSIS.) (UNDERGROUND STRUCTURES; *NUCLEAR EXPLOSIONS; BLAST; PRESSURE; *SHOCK TUBES; STRESSES; STATISTICAL ANALYSIS; THEORY.) (PROPAGATION AND ATTENUATION OF *SHOCK WAVES; DAMPING.)
AMERICAN MACHINE AND FOUNDRY CO.; NILES; ILL.
AD-274 296 62-3-1 DIV. 13

***THIOLS**

(MIXTURES; *HYDROCARBONS; *GLASS; *LOW TEMPERATURE RESEARCH; FREEZING; PHYSICAL PROPERTIES; VISCOSITY; MELTING.) (PENTANES; HEXANES; CYCLOHEXANES.) (ALKYL RADICALS; *SULFIDES; *THIOLS; *IODINE; ETHYL RADICALS; HYDROGEN COMPOUNDS; *IODIDES; ORGANIC SOLVENTS; HYDROCARBONS; *PHOTOLYSIS; PHOTOCHEMICAL REACTIONS.)
LUND U. (SWEDEN).
AD-274 160 62-3-1 DIV. 4

(ORGANIC COMPOUNDS; ALKYL RADICALS; *SULFIDES; *THIOLS; PHOTOLYSIS; *DISSOCIATION; CHEMICAL BONDS; ENERGY; REACTION KINETICS; CHEMICAL REACTIONS; *RECOMBINATION REACTIONS; DISPROPORTIONATION; THERMOCHEMISTRY; *FREE RADICALS.) PHOTOCHEMICAL REACTIONS;

SPECTROGRAPHIC ANALYSIS. LOW TEMPERATURE RESEARCH.
LUND U. (SWEDEN).
AD-274 252 62-3-1 DIV. 4

*TIME

(*DATA PROCESSING SYSTEMS. EFFECTIVENESS. *RELIABILITY.) (*STATISTICAL PROCESSES. *TIME. PROBABILITY.)
DAVID TAYLOR MODEL BASIN. WASHINGTON. D. C.
AD-274 350 62-3-1 DIV. 30

*TIME LAG THEORY

(*REMOTE CONTROL SYSTEMS. RADIO SIGNALS. SERVO SYSTEMS. COMMAND SYSTEMS. *TIME LAG THEORY.) (MOON. VEHICLES. TRACKING. DISPLAY SYSTEMS. FEEDBACK. HUMAN ENGINEERING.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. WASHINGTON. D. C.
AD-274 172 62-3-1 DIV. 8

*TIN COMPOUNDS

(*METALORGANIC COMPOUNDS. CARBON COMPOUNDS. *SILICON COMPOUNDS. *GERMANIUM COMPOUNDS. *TIN COMPOUNDS. *LEAD COMPOUNDS. PHENYL RADICALS. BENZENES. *LUMINESCENT MATERIALS. PHOSPHORESCENT MATERIALS. *LUMINESCENCE. PHOSPHORESCENCE. FLUORESCENCE. SPECTROGRAPHIC ANALYSIS. ULTRAVIOLET SPECTROSCOPY. ABSORPTION. ULTRAVIOLET RADIATION. EXCITATION. HALF LIFE. PHOSPHORESENT DECAY.) (THEORY. QUANTUM MECHANICS. ELECTRON TRANSITIONS.)
AERONAUTICAL RESEARCH LAB., OFFICE OF AEROSPACE RESEARCH. WRIGHT-PATTERSON AIR FORCE BASE. OHIO.
AD-274 295 62-3-1 DIV. 25

(ROCKET CASES. COMBUSTION CHAMBER LINERS FOR SOLID ROCKET PROPELLANTS. *THERMAL INSULATION. POLYMERS. *HEAT RESISTANT POLYMERS.) (SYNTHESIS BY COPOLYMERIZATION. VINYL RADICALS. *METALORGANIC COMPOUNDS. *SILICON COMPOUNDS. *TIN COMPOUNDS. *TITANIUM COMPOUNDS. *CHELATE COMPOUNDS. PROCESSING. AGING WITH CATALYSTS.)
HUGHES AIRCRAFT CO., CULVER CITY. CALIF.
AD-274 393 62-3-1 DIV. 27

*TITANATES

(*FERROELECTRIC MATERIALS. *FERROELECTRIC CRYSTALS. *STRONTIUM COMPOUNDS. *BARIUM COMPOUNDS. *TITANATES. IMPURITIES OF RARE EARTH ELEMENTS SUCH AS GADOLINIUM. IONS. MICROWAVE SPECTROSCOPY. PARAMAGNETIC RESONANCE. NUCLEAR SPINS. TEMPERATURE. PHASE TRANSITIONS. SPECTROGRAPHIC ANALYSIS. REFRACTIVE PROPERTIES.)
RAYTHEON CO., WALTHAM. MASS.
AD-273 981 62-3-1 DIV. 25

*TITANIUM ALLOYS

(*HEAT RESISTANT ALLOYS. *TITANIUM ALLOYS. NIOBIUM ALLOYS. ALUMINUM ALLOYS. TIN ALLOYS. HAFNIUM ALLOYS. ZIRCONIUM ALLOYS. SHEETS. MANUFACTURING METHODS. MECHANICAL PROPERTIES. TENSILE PROPERTIES. DENSITY. OXIDATION. RESISTANCE. HIGH TEMPERATURE RESEARCH.) (MELTING. ELECTRIC ARCS. FORGING. ROLLING MILLS. HEAT TREATMENT.)
ARMOUR RESEARCH FOUNDATION. CHICAGO. ILL.
AD-274 037 62-3-1 DIV. 17

(*TITANIUM ALLOYS. ALUMINUM ALLOYS. MOLYBDENUM ALLOYS. VANADIUM ALLOYS. *SHEETS. PROCESSING. MANUFACTURING METHODS. ROLLING MILLS. HEAT TREATMENT. MECHANICAL PROPERTIES. TENSILE PROPERTIES.)
CRUCIBLE STEEL CO. OF AMERICA. MIDLAND. PA.
AD-274 204 62-3-1 DIV. 17

(METALS. *ALUMINUM. *TITANIUM ALLOYS. *ALUMINUM ALLOYS. VANADIUM ALLOYS. *STEEL. STAINLESS STEEL. MACHINING. *EXTRUSION. EXPLOSIVE FORMING. MANUFACTURING METHODS. FEASIBILITY STUDIES.) (TOOLS. MACHINE TOOLS. DIES. DESIGN. INSTRUMENTATION.) AIRFRAMES. AIRCRAFT. GUIDED MISSILES. SPACESHIPS. ALLOYS. WESTINGHOUSE ELECTRIC CORP., BLAIRSVILLE. PA.
AD-274 381 62-3-1 DIV. 26

(ALLOYS. *ALUMINUM ALLOYS. *MAGNESIUM ALLOYS. *TITANIUM ALLOYS. *STEEL. *STAINLESS STEEL. *NICKEL ALLOYS.) (PLASTICS. *EPOXY RESINS. *EXPANDED PLASTICS. *ACRYLIC RESINS.) (MECHANICAL PROPERTIES. ELECTRICAL PROPERTIES. PHYSICAL PROPERTIES. ELECTRICAL PROPERTIES. DATA. TABLES. INDEXES.)
REPUBLIC AVIATION CORP., FARMINGDALE. N. Y.
AD-274 289 62-3-1 DIV. 17

(*ROCKET CASES. *TITANIUM ALLOYS. VANADIUM ALLOYS. CHROMIUM ALLOYS. ALUMINUM ALLOYS. MANUFACTURING METHODS. FORGING. HEAT TREATMENT. WELDING. ELECTRIC ARCS. ELECTRON BEAMS. MECHANICAL PROPERTIES. MICROSTRUCTURE. AGING.) TENSILE PROPERTIES.
PRATT AND WHITNEY AIRCRAFT, EAST HARTFORD. CONN.
AD-274 334 62-3-1 DIV. 17

(HYDROSTATIC PRESSURE. *EXTRUSION. *STEEL. *TITANIUM ALLOYS. ALUMINUM ALLOYS. VANADIUM ALLOYS.) (*MACHINE TOOLS. HYDRAULIC PRESSES. DESIGN.) (HIGH PRESSURE RESEARCH. *DIES. HYDRAULIC FLUIDS. HYDRAULIC SEALS. METAL SEALS. RUBBER SEALS.) (STRESSES. MATHEMATICAL ANALYSIS. SHEAR STRESSES.)
BATTELLE MEMORIAL INST., COLUMBUS.
AD-274 372 62-3-1 DIV. 26

*TITANIUM COMPOUNDS

(*TITANIUM COMPOUNDS. *BORIDES. *REFRACTORY MATERIALS. THERMODYNAMICS. *VAPORIZATION. HEAT OF FORMATION. HEAT OF SUBLIMATION. THERMOCHEMISTRY. DECOMPOSITION. MASS SPECTROSCOPY. HIGH TEMPERATURE RESEARCH.)
UNION CARBIDE CORP., PARMA. OHIO.
AD-273 978 62-3-1 DIV. 4

(ROCKET CASES. COMBUSTION CHAMBER LINERS FOR SOLID ROCKET PROPELLANTS. *THERMAL INSULATION. POLYMERS. *HEAT RESISTANT POLYMERS.) (SYNTHESIS BY COPOLYMERIZATION. VINYL RADICALS. *METALORGANIC COMPOUNDS. *SILICON COMPOUNDS. *TIN COMPOUNDS. *TITANIUM COMPOUNDS. *CHELATE COMPOUNDS. PROCESSING. AGING WITH CATALYSTS.)
HUGHES AIRCRAFT CO., CULVER CITY. CALIF.
AD-274 393 62-3-1 DIV. 27

*TOPOLOGY

(*TOPOLOGY. *LINEAR PROGRAMMING. *ALGEBRA. INTEGRALS. *INEQUALITIES. DIFFERENTIAL EQUATIONS. GEOMETRY. SEQUENCES.) *NUMERICAL ANALYSIS.
NORTHWESTERN TECHNOLOGICAL INST., EVANSTON. ILL.
AD-274 258 62-3-1 DIV. 15

*TRACKING

(*TRACKING. TESTS. ROTOR ATTITUDE INDICATORS. FLIGHT ATTITUDE INDICATORS.) (*DISPLAY SYSTEMS. FLIGHT INSTRUMENTS. CONFIGURATION. CONTROL STICKS. INSTRUMENT PANELS. HELICOPTERS. SIMULATION.) (VISUAL PERCEPTION. HUMAN ENGINEERING.)
BELL HELICOPTER CO., FORT WORTH. TEX.
AD-273 967 62-3-1 DIV. 1

*TRAINING

(SPACE FLIGHT. MANNED. *ASTRONAUTICS. AVIATION PERSONNEL. *TRAINING. SELECTION. STRESS (PSYCHOLOGY).)
BEHAVIORAL SCIENCES LAB., AERONAUTICAL SYSTEMS DIV., WRIGHT-PATTERSON AIR FORCE BASE. OHIO.
AD-274 190 62-3-1 DIV. 23

*TRAINING DEVICES

(*DIGITAL COMPUTERS. *FLIGHT SIMULATORS. *TRAINING DEVICES. STANDARDIZATION OF SIMULATION. AIRCRAFT. FLAPS. PNEUMATIC SYSTEMS. HYDRAULIC SYSTEMS. TURBOJET ENGINES. FUEL SYSTEMS. LANDING GEAR. ELECTRICAL EQUIPMENT OF JET PLANES. JET BOMBERS. ATTACK BOMBERS. JET FIGHTERS. PATROL PLANES.) (AUTOMATIC PROGRAMMING. MATHEMATICAL LOGIC.)
GOODYEAR AIRCRAFT CORP., AKRON. OHIO.
AD-274 175 62-3-1 DIV. 30

*TRANSDUCERS

(*TRANSDUCERS. *PRESSURE. MEASUREMENT. DESIGN. TESTS. CALIBRATION.) (*HEAT TRANSFER. VIBRATION. OSCILLATION. DAMPING. STABILITY OF LIQUID ROCKET PROPELLANTS. COMBUSTION. ROCKET MOTORS. COMBUSTION CHAMBERS.) NON-DESTRUCTIVE TESTING. ROCKET MOTORS.
PRINCETON U., N. J.
AD-274 184 62-3-1 DIV. 10

(*ACOUSTICS. *TRANSDUCERS. MATHEMATICAL LOGIC. DISPLAY SYSTEMS.) (SOUND. *ANALOG SYSTEMS. PRESSURE. DISTRIBUTION. MATHEMATICAL ANALYSIS.)
PARKE MATHEMATICAL LABS., INC., CARLISLE. MASS.
AD-274 262 62-3-1 DIV. 30

*TRANSFORMATIONS (MATHEMATICS)

(*ALGEBRAIC TOPOLOGY. *TRANSFORMATIONS (MATHEMATICS). *GROUPS (MATHEMATICS).) (SPHERES. POLYNOMIALS. SEQUENCES. DIFFERENTIAL EQUATIONS.)
PENNSYLVANIA U., PHILADELPHIA.
AD-274 264 62-3-1 DIV. 15

*TRANSISTOR AMPLIFIERS

(*TRANSISTORS. *TRANSISTOR AMPLIFIERS. GERMANIUM. HIGH FREQUENCY. DESIGN. PROCESSING. TESTS.) (*MICROWAVE NETWORKS. *PACKAGED CIRCUITS. *MICROWAVE OSCILLATORS. *MICROWAVE AMPLIFIERS. MIXER TUBES.) (MICROWAVE EQUIPMENT. TEST EQUIPMENT. SIGNAL-TO-NOISE RATIO. MEASUREMENT. MATHEMATICAL ANALYSIS. ELECTROSTATIC CAPACITANCES. IMPEDANCE. ELECTRICAL PROPERTIES.. MECHANICAL PROPERTIES.)
(ALLOYS. GOLD. ALUMINUM.)
HUGHES AIRCRAFT CO., NEWPORT BEACH. CALIF.
AD-274 006 62-3-1 DIV. 8

*TRANSISTORS

(*TRANSISTORS. *TRANSISTOR AMPLIFIERS. GERMANIUM. HIGH FREQUENCY. DESIGN. PROCESSING. TESTS.) (*MICROWAVE NETWORKS. *PACKAGED CIRCUITS. *MICROWAVE OSCILLATORS. *MICROWAVE AMPLIFIERS. MIXER TUBES.) (MICROWAVE EQUIPMENT. TEST EQUIPMENT. SIGNAL-TO-NOISE RATIO. MEASUREMENT. MATHEMATICAL ANALYSIS. ELECTROSTATIC CAPACITANCES. IMPEDANCE. ELECTRICAL PROPERTIES.. MECHANICAL PROPERTIES.)
(ALLOYS. GOLD. ALUMINUM.)
HUGHES AIRCRAFT CO., NEWPORT BEACH. CALIF.
AD-274 006 62-3-1 DIV. 8

(SILICON. SILICON COMPOUNDS. *CARBIDES. RADIATION TOLERANCE. *SEMICONDUCTORS.) (HIGH FREQUENCY. *TRANSISTORS. THERMAL UTILIZATION. TEST EQUIPMENT.)
STURTEVANT DIV., WESTINGHOUSE ELECTRIC CORP., BOSTON. MASS.
AD-274 187 62-3-1 DIV. 25

(DETERMINATION. *PHYSICAL PROPERTIES. *TRANSISTORS. SILICON. THEORY. MATHEMATICAL ANALYSIS. TESTS. MEASUREMENT.)
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY.
AD-274 237 62-3-1 DIV. 8

(*TRANSISTORS. *SEMICONDUCTORS. *SEMICONDUCTING FILMS. MANUFACTURING METHODS. VAPORS. DEPOSITS ON SINGLE CRYSTALS. THIN FILMS OF SILICON ON BORON. SILICON COMPOUNDS. DIOXIDES. IMPURITIES. DIFFUSION.) (RESISTANCE. ELECTRICAL PROPERTIES. CONTROL.) (VAPORS. CHLORIDES. SILANES. DECOMPOSITION.) (PHOSPHORUS COMPOUNDS. OXYCHLORIDES.)
PACIFIC SEMICONDUCTORS, INC., LAWNDALE. CALIF.
AD-274 863 62-3-1 DIV. 8

*TRANSLATIONS

(*REPORTS. SCIENTIFIC REPORTS. CONFERENCES. *TRANSLATIONS. PERIODICALS. *BIBLIOGRAPHY.) (*SCIENTIFIC RESEARCH. MILITARY RESEARCH. ELECTRONICS. RADAR. RADIO. COMMUNICATION SYSTEMS. COMPUTERS.)
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
AD-274 253 62-3-1 DIV. 32

*TRANSMISSION

(*LIGHT. *TRANSMISSION. *SCATTERING. FOG. HAZE. SMOKES. MEASUREMENT. INSTRUMENTATION.) (BALLOONS. PHOTOFLASH BULBS. CAMERAS.) LIGHT TRANSMISSION.
TECHNICAL OPERATIONS, INC., BURLINGTON. MASS.
AD-274 189 62-3-1 DIV. 25

*TRANSMISSION LINES

(*HELICAL ANTENNAS. BROADBAND. *ANTENNA RADIATION PATTERNS. ELECTROMAGNETIC FIELDS. POLARIZATION. PHASE MEASUREMENT. MATHEMATICAL ANALYSIS.) (*ANTENNAS. HELIXES. *TRANSMISSION LINES. *WAVEGUIDE SLOTS. BROADBAND PROBES. TEST EQUIPMENT.) BICONICAL ANTENNAS. ANTENNA HORNS.
ELECTRONICS RESEARCH LAB., U. OF CALIF., BERKELEY.
AD-274 238 62-3-1 DIV. 8

*TRANSURANIC ELEMENTS

(*COMPLEX COMPOUNDS. *TRANSURANIC ELEMENTS. CHEMICAL PROPERTIES. SEPARATION. PRECIPITATION. *NEPTUNIUM COMPOUNDS. *PLUTONIUM COMPOUNDS. AMERICIUM COMPOUNDS. CURIUM. BERKELIUM. CALIFORNIA.) BIBLIOGRAPHY.
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND. WRIGHT-PATTERSON AIR FORCE BASE. OHIO.
AD-274 119 62-3-1 DIV. 4

*TRAVELING WAVE TUBES

(*TRAVELING WAVE TUBES. *MIXER TUBES. *MICROWAVE AMPLIFIERS. HELIXES. SIGNAL-TO-NOISE RATIO. NOISE (RADIO). DESIGN. TESTS.) (*PARAMETRIC AMPLIFIERS. ELECTRON GUNS. CATHODES (ELECTRON TUBES). ANODES (ELECTRON TUBES). ELECTRODES. CYCLOTRONS. SPACE CHARGES. ELECTRON BEAMS. MAGNETS. TESTS.) (WAVEGUIDE COUPLERS. COUPLING CIRCUITS. X BAND. L BAND. MICROWAVE OSCILLATORS.)
SPERRY GYROSCOPE CO., GREAT NECK. N. Y.
AD-274 079 62-3-1 DIV. 8

(*TRAVELING WAVE TUBES. *KLYSTRONS. *MICROWAVE AMPLIFIERS. ULTRA HIGH FREQUENCY. HELIXES. COUPLING CIRCUITS. S BAND. STANDING WAVE RATIOS. THEORY.) (AMPLIFIERS. ELECTRON TUBES. *ELECTRON GUNS. CATHODES (ELECTRON TUBES). SPACE CHARGES. NUMERICAL METHODS AND PROCEDURES. MATHEMATICAL ANALYSIS. THEORY.) (MAGNETRONS. ELECTRON BEAMS. PLASMA PHYSICS. ELECTRIC FIELDS. MAGNETIC FIELDS.)
ELECTRON PHYSICS LAB., U. OF MICHIGAN. ANN ARBOR.
AD-274 110 62-3-1 DIV. 8

***TRIGGERED GATES**

(*COMPUTER LOGIC, *TRIGGERED GATES, TRANSISTORS, *DIODES, DELAY CIRCUITS,) DIGITAL COMPUTERS, *MEMORY DEVICES, PROGRAMMING,
RCA INDUSTRIAL ELECTRONIC PRODUCTS, CAMDEN, N. J.,
AD-274 177 62-3-1 DIV. 30

***TRIODES**

(*ELECTRONICS, *TEXTBOOKS, USSR,) (ELECTRON TUBES, AMPLIFIERS, RADIO RECEIVERS, RADIO TRANSMITTERS,) (ELECTRON TUBES, SUPERHIGH FREQUENCY,) ELECTRONS, THEORY, *ELECTRON OPTICS, THERMIONIC EMISSION, PHOTOEMISSION, *CATHODES, OXIDE CATHODES, *DIODES, *TRIODES, TETRODES, PENTODES, *ELECTRON TUBES, FREQUENCY CONVERTERS, *SEMICONDUCTORS, *CATHODE RAY TUBES, KLYSTRONS, MAGNETRONS, TRAVELING WAVE TUBES, *PHOTOTUBES, PHOTOMULTIPLIERS, X RAYS, ELECTRON TUBES,
FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO,
AD-274 063 62-3-1 DIV. 8

***TUNGSTEN**

(SINGLE CRYSTALS, *TUNGSTEN, *TUNGSTEN ALLOYS, PREPARATION, GROWTH, PROCESSING, MECHANICAL PROPERTIES, PHYSICAL PROPERTIES,) (TUNGSTEN, ADDITIVES OF NIOBIUM, ZIRCONIUM, TITANIUM, HAFNIUM, IRIDIUM, TANTALUM, TANTALUM COMPOUNDS, CARBIDES, THORIUM COMPOUNDS, ALUMINUM COMPOUNDS, OXIDES, POTASSIUM COMPOUNDS, SILICATES,) (SURFACES, GRINDERS, PICKLING, HEATING, FORGING, ROLLING MILLS, HARDNESS, CRYSTAL STRUCTURE, CRYSTALLIZATION, TRANSITION TEMPERATURE, DETERMINATION,)
LINDE CO., INDIANAPOLIS, IND.
AD-273 951 62-3-1 DIV. 17

(ROCKET MOTORS, SOLID ROCKET PROPELLANTS, *ROCKET MOTOR NOZZLES OF *TUNGSTEN, EROSION, THERMAL STRESSES, SHOCK, STRESSES, TESTS, MATHEMATICAL ANALYSIS,) (EFFECTIVENESS OF SIMULATION OF EXHAUST GASES BY PLASMA JETS,) HIGH TEMPERATURE RESEARCH,
STANFORD RESEARCH INST., MENLO PARK, CALIF.
AD-274 131 62-3-1 DIV. 27

(BRITTLE MATERIALS, *REFRACTORY MATERIALS, *TUNGSTEN, *SINGLE CRYSTALS, GROWTH, PREPARATION, PURIFICATION, ZONE MELTING, ELECTRON BOMBARDMENT, THERMIONIC EMISSION,) (CRYSTAL STRUCTURE, DEFORMATION, FRACTURE (MECHANICS), TENSILE PROPERTIES, SHEAR STRESSES, STRESSES, LATTICES, PLASTICITY, PLASTIC FLOW, TRANSITION TEMPERATURE, CRYSTALLIZATION,) (*MOLYBDENUM ALLOYS, *RHENIUM ALLOYS,) ALLOYS, METALS, LOW TEMPERATURE RESEARCH,
GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
AD-274 151 62-3-1 DIV. 17

***TUNGSTEN ALLOYS**

(SINGLE CRYSTALS, *TUNGSTEN, *TUNGSTEN ALLOYS, PREPARATION, GROWTH, PROCESSING, MECHANICAL PROPERTIES, PHYSICAL PROPERTIES,) (TUNGSTEN, ADDITIVES OF NIOBIUM, ZIRCONIUM, TITANIUM, HAFNIUM, IRIDIUM, TANTALUM, TANTALUM COMPOUNDS, CARBIDES, THORIUM COMPOUNDS, ALUMINUM COMPOUNDS, OXIDES, POTASSIUM COMPOUNDS, SILICATES,) (SURFACES, GRINDERS, PICKLING, HEATING, FORGING, ROLLING MILLS, HARDNESS, CRYSTAL STRUCTURE, CRYSTALLIZATION, TRANSITION TEMPERATURE, DETERMINATION,)
LINDE CO., INDIANAPOLIS, IND.
AD-273 951 62-3-1 DIV. 17

(SHEETS, *MOLYBDENUM ALLOYS, *TUNGSTEN ALLOYS, NIOBIUM ALLOYS, TITANIUM ALLOYS, ZIRCONIUM ALLOYS, CARBON ALLOYS,) (PROCESSING, MELTING, ELECTRIC ARCS, VACUUM FURNACES, CASTING, EXTRUSION, ROLLING MILLS, HEAT TREATMENT, CRYSTALLIZATION, GRAINS (METALLURGY), HARDNESS, TENSILE PROPERTIES, SURFACE PROPERTIES,)
CLIMAX MOLYBDENUM CO. OF MICHIGAN, DETROIT,
AD-274 206 62-3-1 DIV. 17

(*SHEETS, REFRACTORY MATERIALS, METALS, ALLOYS, *TUNGSTEN ALLOYS, POWDER METALLURGY, MELTING, ELECTRIC ARCS, PREPARATION, SINTERING, CONTROLLED ATMOSPHERES, HYDROGEN, LOW PRESSURE RESEARCH, ROLLING MILLS, HEAT TREATMENT, HARDNESS, MICROSTRUCTURE, TRANSITION TEMPERATURE,) (POWDER ALLOYS, POWDER METALS, TUNGSTEN, MANGANESE, IRON, COBALT, NICKEL, RUTHENIUM, RHODIUM, PALLADIUM, RHENIUM, OSMIUM, IRIDIUM, PLATINUM, PARTICLES, ADDITIVES, OXIDES, THORIUM COMPOUNDS, ZIRCONIUM COMPOUNDS,) HEAT RESISTANT ALLOYS,
BATTELLE MEMORIAL INST., COLUMBUS, OHIO,
AD-274 374 62-3-1 DIV. 17

***TURBOJET ENGINES**

(EFFECTIVENESS OF *FUEL NOZZLES WHEN USING CONTAMINATED JET ENGINE FUELS,) (*TURBOJET ENGINES, FUEL SYSTEMS, FUEL FILTERS, FUEL INJECTORS, *TURBOJET FUEL NOZZLES,) (FUEL INJECTION, FUEL SPRAYS, DISTORTION BY IMPURITIES IN FUELS AND EFFECT ON COMBUSTION,) FUNGI,
PRATT AND WHITNEY AIRCRAFT, WEST PALM BEACH, FLA.,
AD-274 338 62-3-1 DIV. 27

***TURBOJET FUEL NOZZLES**

(EFFECTIVENESS OF *FUEL NOZZLES WHEN USING CONTAMINATED JET ENGINE FUELS,) (*TURBOJET ENGINES, FUEL SYSTEMS, FUEL FILTERS, FUEL INJECTORS, *TURBOJET FUEL NOZZLES,) (FUEL INJECTION, FUEL SPRAYS, DISTORTION BY IMPURITIES IN FUELS AND EFFECT ON COMBUSTION,) FUNGI,
PRATT AND WHITNEY AIRCRAFT, WEST PALM BEACH, FLA.,
AD-274 338 62-3-1 DIV. 27

***TURBULENCE**

(CONFIGURATION OF *CLOUDS BY AERIAL PHOTOGRAPHY AND MAPPING TECHNIQUES USING *AERIAL CAMERAS,) (*AIRCRAFT, *TURBULENCE, GUST LOADS, FLIGHT PATHS,)
COLORADO STATE U. RESEARCH FOUNDATION, FORT COLLINS,
AD-274 269 62-3-1 DIV. 2

(ATMOSPHERE, *TURBULENCE, *AVIATION ACCIDENTS,) (*JET STREAMS (METEOROLOGY), WIND, TEMPERATURE,) GRAVITY,
COLORADO STATE U. RESEARCH FOUNDATION, FORT COLLINS,
AD-274 376 62-3-1 DIV. 2

***ULTRASONICS**

(*DOPPLER RADAR, RADAR PULSES, RADAR REFLECTIONS, RANGE FINDING, DISPLAY SYSTEMS, *DATA PROCESSING SYSTEMS, RADAR EQUIPMENT, ELECTRONIC CIRCUITS, DESIGN,) (RADAR SIGNALS, *VIDEO SIGNALS, *FREQUENCY ANALYZERS, SWEEP GENERATORS, STORAGE TUBES, MODULATORS, OPTICAL SYSTEMS, TIMING CIRCUITS, *ULTRASONICS, IMAGE CONVERTER TUBES, TESTS,) (RADAR RECEIVERS, RADAR RANGE COMPUTERS,)
APPLIED PHYSICS LAB., JOHNS HOPKINS U., SILVER SPRING, MD.
AD-274 136 62-3-1 DIV. 6

***ULTRAVIOLET RADIATION**

(*RADIOBIOLOGY, RADIATION INJURIES, LABORATORY ANIMALS, BRAINS, BLOOD, RECOVERY, SURVIVAL,) (*RADIATION EFFECTS OF ULTRA HIGH FREQUENCY, *MICROWAVES, *ULTRAVIOLET RADIATION, X RAYS, GAMMA RAYS, IONIZATION,) DOSE RATE,
ROCHESTER U., N. Y.
AD-274 338 62-3-1 DIV. 16

***UNDERGROUND EXPLOSIONS**

(DETECTION OF *UNDERGROUND EXPLOSIONS, EARTHQUAKES, EXPLOSIONS BY *SEISMOGRAPHS,) *SEISMIC WAVES, ELECTROMAGNETIC WAVES, MEASUREMENT, OCEAN BOTTOM, GEOLOGY, GREAT BRITAIN,
ACOUSTICS AND SEISMICS LAB., U. OF MICHIGAN, ANN ARBOR,
AD-274 106 62-3-1 DIV. 2

***UNDERGROUND STRUCTURES**

(*UNDERGROUND STRUCTURES, MATERIALS, *CONCRETE, CEMENT, *ACOUSTIC INSULATION, VIBRATION ISOLATORS, VERMICULITE, IMPACT SHOCK, SHOCK RESISTANCE, DEFORMATION, STRESSES, ATTENUATION, TEST METHODS, TEST EQUIPMENT,) (NUCLEAR EXPLOSIONS, ATOMIC BOMB EXPLOSIONS,)
STRUCTURAL MECHANICS RESEARCH LAB., U. OF TEXAS, AUSTIN,
AD-274 129 62-3-1 DIV. 14

(DETERMINATION OF PRESSURE, *BLAST IN TUNNELS RESULTING FROM EXTERIOR *UNDERGROUND STRUCTURES, *NUCLEAR EXPLOSIONS,) (ATTENUATION, PROPAGATION, REFLECTION OF SHOCK WAVES IN TUNNELS,) (BLAST SHIELDING,) (*SHOCK TUBES FOR TESTING, BLAST IN TUNNELS,)
BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
AD-274 228 62-3-1 DIV. 22

(*UNDERGROUND STRUCTURES, SOILS, AIR BLAST, LOAD DISTRIBUTION, *THERMONUCLEAR EXPERIMENTS, MODEL TESTS, DYNAMICS, SIMULATION, MATHEMATICAL ANALYSIS,) (UNDERGROUND STRUCTURES, *NUCLEAR EXPLOSIONS, BLAST, PRESSURE, *SHOCK TUBES, STRESSES, STATISTICAL ANALYSIS, THEORY,) (PROPAGATION AND ATTENUATION OF *SHOCK WAVES, DAMPING,)
AMERICAN MACHINE AND FOUNDRY CO., NILES, ILL.
AD-274 294 62-3-1 DIV. 13

***UNDERWATER EXPLOSIONS**

(PHOTOGRAPHS OF *LIGHTNING, WATER, WATER VAPOR, *UNDERWATER EXPLOSIONS, CONDUCTORS, PULSE GENERATORS, ELECTRIC FIELDS, ELECTRIC DISCHARGES,)
NAVAL ORDNANCE LAB., WHITE OAK, MD.
AD-274 322 62-3-1 DIV. 2

***UNDERWATER SOUND**

(*BIBLIOGRAPHY, *UNDERWATER SOUND, *UNDERWATER SOUND TRANSMISSION,) (SOUND, ACOUSTICS, SOUND RANGING, DETECTION, SOUND TRANSMISSION,) (OCEAN BOTTOM, OCEANOGRAPHY, SUBMARINE NOISE,)
HUDSON LABS., COLUMBIA U., DOBBS FERRY, N. Y.
AD-273 960 62-3-1 DIV. 25

***UNDERWATER SOUND TRANSMISSION**

(*BIBLIOGRAPHY, *UNDERWATER SOUND, *UNDERWATER SOUND TRANSMISSION,) (SOUND, ACOUSTICS, SOUND RANGING, DETECTION, SOUND TRANSMISSION,) (OCEAN BOTTOM, OCEANOGRAPHY, SUBMARINE NOISE,)
HUDSON LABS., COLUMBIA U., DOBBS FERRY, N. Y.
AD-273 960 62-3-1 DIV. 25

***UPPER ATMOSPHERE**

(*GUIDED MISSILES, EXHAUST GASES OR *CONDENSATION TRAILS OF *LIGHT AND *LUMINESCENCE WITH RESPECT TO VELOCITY AND DISTANCE OF *PARTICLES EJECTED IN *UPPER ATMOSPHERE,) (AERODYNAMICS, *DRAG, GRAVITY, DIFFERENTIAL EQUATIONS, INTEGRATION, TABLES,)
GEOPHYSICS CORP. OF AMERICA, BEDFORD, MASS.
AD-273 972 62-3-1 DIV. 25

***URETHANES**

(*ELASTOMERS, *POLYMERS, *URETHANES, RADIATION EFFECTS, GAMMA RAYS, NEUTRON BOMBARDMENT, DOSAGE, TEMPERATURE, HIGH TEMPERATURE RESEARCH, LOW TEMPERATURE RESEARCH, STRESSES, MECHANICAL PROPERTIES, TENSILE PROPERTIES, THEORY,) *VULCANIZATES,
GENERAL DYNAMICS/FORT WORTH, TEX.
AD-274 331 62-3-1 DIV. 14

***URINE**

(*WATER, RECOVERY AND PURIFICATION FROM *METABOLIC PRODUCTS,) (CLOSED-CYCLE ECOLOGICAL SYSTEMS, SPACE FLIGHT, SPACE MEDICINE,) (*URINE, PROCESSING, VAPORIZATION,)
SPACE SCIENCES LAB., GENERAL ELECTRIC CO., PHILADELPHIA, PA.
AD-274 149 62-3-1 DIV. 16

***VAPOR PLATING**

(*SUPERCONDUCTORS, THIN FILMS, PRODUCTION, MANUFACTURING METHODS BY *VAPOR PLATING, *METAL COATINGS OF METAL FILMS, LEAD, TIN AND *PLASTIC COATINGS, POLYMERS, SILICONES, ELECTRIC INSULATION,) LOW TEMPERATURERESEARCH LOW PRESSURE RESEARCH, ELECTRONIC EQUIPMENT, CIRCUITS,
SPACE TECHNOLOGY LABS., INC., LOS ANGELES, CALIF.
AD-274 030 62-3-1 DIV. 8

***VAPORIZATION**

(*TITANIUM COMPOUNDS, *BORIDES, *REFRACTORY MATERIALS, THERMODYNAMICS, *VAPORIZATION, HEAT OF FORMATION, HEAT OF SUBLIMATION, THERMOCHEMISTRY, DECOMPOSITION, MASS SPECTROSCOPY, HIGH TEMPERATURE RESEARCH,)
UNION CARBIDE CORP., PARMA, OHIO,
AD-273 978 62-3-1 DIV. 4

***VIBRATION ISOLATORS**

(*UNDERGROUND STRUCTURES, MATERIALS, *CONCRETE, CEMENT, *ACOUSTIC INSULATION, VIBRATION ISOLATORS, VERMICULITE, IMPACT SHOCK, SHOCK RESISTANCE, DEFORMATION, STRESSES, ATTENUATION, TEST METHODS, TEST EQUIPMENT,) (NUCLEAR EXPLOSIONS, ATOMIC BOMB EXPLOSIONS,)
STRUCTURAL MECHANICS RESEARCH LAB., U. OF TEXAS, AUSTIN,
AD-274 129 62-3-1 DIV. 14

***VIDEO SIGNALS**

(*DOPPLER RADAR, RADAR PULSES, RADAR REFLECTIONS, RANGE FINDING, DISPLAY SYSTEMS, *DATA PROCESSING SYSTEMS, RADAR EQUIPMENT, ELECTRONIC CIRCUITS, DESIGN,) (RADAR SIGNALS, *VIDEO SIGNALS, *FREQUENCY ANALYZERS, SWEEP GENERATORS, STORAGE TUBES, MODULATORS, OPTICAL SYSTEMS, TIMING CIRCUITS, *ULTRASONICS, IMAGE CONVERTER TUBES, TESTS,) (RADAR RECEIVERS, RADAR RANGE COMPUTERS,)
APPLIED PHYSICS LAB., JOHNS HOPKINS U., SILVER SPRING, MD.
AD-274 136 62-3-1 DIV. 6

***VISUAL ACUITY**

(*VISUAL ACUITY, VISIBILITY, RANGE, FOG, CLOUDS, *ILLUMINATION,)
INTERMOUNTAIN WEATHER, INC., SALT LAKE CITY, UTAH,
AD-274 397 62-3-1 DIV. 16

***VULCANIZATES**

(*ELASTOMERS, *POLYMERS, *URETHANES; RADIATION EFFECTS; GAMMA RAYS; NEUTRON BOMBARDMENT; DOSAGE; TEMPERATURE; HIGH TEMPERATURE RESEARCH; LOW TEMPERATURE RESEARCH; STRESSES; MECHANICAL PROPERTIES; TENSILE PROPERTIES; THEORY.) *VULCANIZATES.
GENERAL DYNAMICS/FORT WORTH, TEX.
AD-274 331 62-3-1 DIV. 14

***WATER**

(*WATER; RECOVERY AND PURIFICATION FROM *METABOLIC PRODUCTS.) (CLOSED-CYCLE ECOLOGICAL SYSTEMS; SPACE FLIGHT; SPACE MEDICINE.) (*URINE; PROCESSING; VAPORIZATION.)
SPACE SCIENCES LAB.; GENERAL ELECTRIC CO.; PHILADELPHIA, PA.
AD-274 149 62-3-1 DIV. 16

***WAVEGUIDE FILTERS**

(*WAVEGUIDE FILTERS; *BAND-PASS FILTERS; *SUPERHIGH FREQUENCY FILTERS; WAVEGUIDE COUPLERS; RADIOFREQUENCY FILTERS; X BAND; DESIGN.) (WAVEGUIDES; COUPLING CIRCUITS; TUNING DEVICES; PHASE SHIFTERS; MATHEMATICAL ANALYSIS.) (ELECTRICAL PROPERTIES; RESONANCE; STANDING WAVE RATIOS; MEASUREMENT.)
DIAMOND ORDNANCE FUZE LABS.; WASHINGTON, D. C.
AD-274 147 62-3-1 DIV. 8

***WAVEGUIDES**

(*ELECTROMAGNETIC WAVES; *SCATTERING; PROPAGATION IN *WAVEGUIDES.) (*COMMUNICATION SYSTEMS; *WIRE; CONDUCTIVITY; *ANTENNA RADIATION PATTERNS; HELICAL ANTENNAS.)
CRUFT LAB.; HARVARD U.; CAMBRIDGE, MASS.
AD-274 142 62-3-1 DIV. 25

*WEIGHTLESSNESS

(PHYSICAL PROPERTIES OF *ETHANOLS; *MERCURY IN SPHERES; PROPELLANT TANKS DURING *WEIGHTLESSNESS.) (LIQUID ROCKET PROPELLANTS; SURFACE TENSION; SURFACE PROPERTIES; CONFIGURATION; FLUID MECHANICS.)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; WASHINGTON, D. C.
AD-274 170 62-3-1 DIV. 9

***WELDING**

(*CASTINGS; MOLDING; MANUFACTURING METHODS; ROLLING MILLS; *SHEETS, METALS; ALLOYS; LIQUID METALS; STEEL; IRON.) (*ELECTRIC WELDING; *ARC WELDING; *WELDING; ELECTRON BEAMS; AUTOMATIC; PRESSURE; VIBRATION; ULTRASONICS; SLAGS.) USSR.
FOREIGN TECH. DIV.; AIR FORCE SYSTEMS COMMAND; WRIGHT-PATTERSON AIR FORCE BASE, OHIO.
AD-274 120 62-3-1 DIV. 26

***WIND**

(*WIND; STATISTICAL ANALYSIS.)
GUIDED MISSILE TRAJECTORIES.
ARMY ORDNANCE MISSILE COMMAND; REDSTONE ARSENAL; HUNTSVILLE, ALA.
AD-274 191 62-3-1 DIV. 2

(*WIND; *GUSTS; HURRICANES; VELOCITY.)
4TH WEATHER GROUP; EGLIN AIR FORCE BASE, FLA.
AD-274 240 62-3-1 DIV. 2

(*WIND; MEASUREMENT; INSTRUMENTATION; FEASIBILITY STUDIES.) (TURBULENCE; RADAR; *DOPPLER TRACKING.) (RADAR, DOPPLER TRACKING; *ACOUSTIC DETECTORS.) (AIR; HEAT; BUBBLES; *INFRARED TRACKING.)
MIDWEST RESEARCH INST.; KANSAS CITY, MO.
AD-274 234 62-3-1 DIV. 2

***WIRE**

(*ELECTROMAGNETIC WAVES; *SCATTERING; PROPAGATION IN *WAVEGUIDES.) (*COMMUNICATION SYSTEMS; *WIRE; CONDUCTIVITY; *ANTENNA RADIATION PATTERNS; HELICAL ANTENNAS.)
CRUFT LAB.; HARVARD U.; CAMBRIDGE, MASS.
AD-274 142 62-3-1 DIV. 25

***ZINC COMPOUNDS**

(*PHOSPHORS; *ZINC COMPOUNDS; *SULFIDES; POWDERS; *LUMINESCENT MATERIALS; *LUMINESCENCE; *PHOTOEMISSION; EXCITATION; VOLTAGE; SOLID STATE PHYSICS; THEORY.)
DIELECTRICS.
NATIONAL ELECTROTECHNICAL INST. (ITALY).
AD-273 963 62-3-1 DIV. 25

TECHNICAL ABSTRACT BULLETIN

1. AIRCRAFT AND FLIGHT EQUIPMENT

AD-273 967 Div. 1, 28
(TISTB/AW) OTS price $1.60

Bell Helicopter Co., Fort Worth, Tex.
TRACKING PERFORMANCE AS AFFECTED BY THE POSITION OF THE ATTITUDE DISPLAY.
Rept. on Army-Navy Instrumentation Program,
by Claude B. Elam, Jack Emery and W. G. Matheny. Mar 62, 14p. incl. illus. tables, 3 refs. (Rept. no. D228-421-010)
(Contract Nonr-167000)
Unclassified report

DESCRIPTORS: (*Tracking, Tests, Rotor attitude indicators, Flight attitude indicators.) (*Display systems, Flight instruments, Configuration, Control sticks, Instrument panels, Helicopters, Simulation.) (Visual perception, Human engineering.)

A study was conducted to determine if the position of an attitude display with reference to the orientation of the subject and the position of the control stick affected performance. Performance was adversely affected when the display was rotationally offset 45 degrees from a line passing through the subject's body and the control stick, as compared to the condition where the display was directly in front of the subject. (Author)

AD-273 976 Div. 1, 25
(TISTA/WAW) OTS price $4.60

Princeton U., N. J.
AN INVESTIGATION OF ELECTRICAL CHARGING AND DISCHARGING OF AIRCRAFT IN FLIGHT,
by Gerard J. Born and Enoch J. Durbin. Dec 61, 41p. illus. 24 refs. (Rept. no. 593)
(Contract DA 44-177-tc-524, Proj. 9-38-01-000)
Unclassified report

DESCRIPTORS: (*Helicopters, Reduction of *Static electricity by *Electric discharges, Electrical corona, Mathematical analysis.) (Helicopters, Hazards, *Aviation safety, Analysis, Countermeasures.) (Atmosphere, Atmospherics, Electrical properties.)

A short theoretical investigation is made of the factors involved in the charging and discharging process of an airborne helicopter. The dominant factor in keeping this charge small is a short discharge time constant compared with the charging time constant. Practically, the only means of controlling the discharge time constant is by controlling the resistivity of the air. Possible methods are discussed and evaluated. It is concluded that only corona discharge systems seem feasible at this time. Three possible corona discharge methods are discussed: Active DC corona point, including a measurement device and sensing element mounted on the ship; Active corona system with 2 DC corona points of opposite polarity mounted on the rotor blades, not requiring measuring and sensing elements; and Active corona system with AC corona point having a low frequency (400 cycles per second) AC voltage mounted on the rotor blades, not requiring measuring and sensing elements. (Author)

AD-274 057 Div. 1, 25
(TISTP/JW) OTS price $7.60

Hydronautics, Inc., Rockville, Md.
THE DESIGN OF TWO DIMENSIONAL LOW DRAG, BASE-VENTED STRUTS,
by S. E. Starley and V. E. Johnson, Jr. Mar 62, 39p. illus. tables, 11 refs. (Technical rept. no. 001-11)
(Contract NObs-78396)
Unclassified report

DESCRIPTORS: (*Hydrofoils, *Cavitation.) (Drag, Friction, Hydrodynamics.) Numerical methods and procedures.

Linearized cavity flow theory is used to determine the shape and drag of a series of base-vented strut sections having a prescribed chordwise pressure distribution. Stagnation pressure at the nose of the strut is generated by two methods: a flat plate normal to the flow at zero cavitation number, and a parabolic-type nose singularity. The chordwise pressure distributions were specified in the equivalent airfoil plane to be either in the form of a sine series or a symmetrical flat roof top. Numerical calculations were carried out for a series of struts derived by combining the various perturbation flows with the two types of stagnation regions to determine the strut shape, section modulus, minimum pressure coefficient and cavity drag coefficient. Comparison of experimental and theoretical results and the effects of finite base cavitation number and frictional resistance are discussed. Charts for determining the coordinates of the optimum strut for a given design problem are presented. (Author)

AD-274 086 Div. 1, 2, 22
(TISTW/RD) OTS price $3.60

Air Force Special Weapons Center, Kirtland Air Force Base, N. Mex.
BLUE SCOUT JUNIOR FLIGHT 02.
Final rept.,
by J. M. Kamm, Jr. Mar 62, 34p. incl. illus. table (Rept. no. AFSWC TDR 62-24)
(Proj. 7811)
Unclassified report

DESCRIPTORS: (Flight testing of *Sounding rockets for Measurement of Solar winds, Protons beyond Outer radiation belt.) (Analysis of Flight paths of Test vehicles, Supersonic test vehicles.) (Position finding of Sounding rockets from Telemetering data.) (Radar tracking, Optical tracking of *Rockets on Upper atmosphere.) Protons, *Interstellar matter, Telemeter systems.

Results are presented of the Blue Scout Junior Flight 0-2, which was launched from Pt. Arguello, Pacific Missile Range, on 4 Dec. 1961. Although this flight was unsuccessful, data were obtained from FPS-16 skin track radar, which is accurate until second-stage burnout, and from TLM-18 signal strength data. Since no vehicle instrumentation was aboard this flight, causes of failure cannot be accurately determined. Motor and component performance is described as far as possible from the data available. (Author)

AD-274 159 Div. 1, 9
(TISTA/LSK) OTS price $10.50

Kellett Aircraft Corp., Philadelphia, Pa.
ON THE AERODYNAMIC DESIGN OF PROPELLERS AND DUCT SYSTEMS FOR GROUND EFFECT VEHICLES,
by Richard R. Pruyn, A. A. Perlmutter, and N. Miller. 15 Jan 62, 120p. incl. illus. tables, 16 refs. (Rept. no. 208A90-1)
(Subcontract to Princeton U., N. J., Contract DA 44-177-tc-524)

Unclassified report

DESCRIPTORS: (*Flying platforms, Ground effect, Design.) (Induction systems, Duct inlets, *Shrouded propellers, Ducted fans, *Ducts, Configuration, Aerodynamics.) (Nozzles, Gas flow, Jets, Velocity, Thrust, Pressure, Effectiveness, Mathematical analysis.)

An analytical and experimental investigation was performed to establish design methods for propeller and duct systems operating in ground effect. Methods are formulated for the calculation of propeller-in-duct performance. A simple analysis is made of the effect of exit nozzle velocity distribution and it is found that a constant nozzle velocity results in a maximum lift to power ratio. A qualitative analysis is made also of the duct efficiency. The similarity parameters of ground effect machines are determined. The effect of various geometric and operational parameters on the internal performance of propeller-duct systems in the proximity of the ground were studied. Maximum over-all internal efficiencies of 78% for an axially symmetric ducting system and 68% for a curved duct system were obtained. (Author)

AD-274 328 Div. 1, 9
(TISTA/LSK) OTS price $.75

National Aeronautics and Space Administration, Washington, D. C.
FLIGHT-TEST INVESTIGATION OF A MODEL OF AN AERIAL VEHICLE SUPPORTED BY FOUR UNSHROUDED PROPELLERS,
by Robert H. Kirby. Apr 62, 24p. incl. illus. 5 refs. (Technical note D-1235)

Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1235.

DESCRIPTORS: (*Flying platforms, Vertical take-off planes, Dynamics, Oscillations, Control, Stability (Lateral), Stability (Longitudinal), Pitch, Roll, Flight testing, Model tests.) Aerial propellers.

A dynamic stability and control investigation showed that the uncontrolled hovering motions of the model were unstable oscillations in pitch and roll. However, inasmuch as the periods of the oscillations were relatively long, the model could be controlled fairly easily in hovering without artificial stabilization. The basic model was difficult to control at the higher forward speeds of the investigation but easy to fly when horizontal and vertical tails were added.

AD-274 363 Div. 1, 9
(TISTA/LSK) OTS price $8.10

Aeronutronic, Newport Beach, Calif.
PROGRAM FOR REDUCTION OF HYDRO-SKIMMER POWER REQUIREMENTS.
Rept. on Special Programs Operations,
by William L. Rawlings and Donald H. Seiveno. Nov 61, 1v. incl. illus. 6 refs. (Publication no. U-1458)
(Contract NObs-84364)

Unclassified report

DESCRIPTORS: (*Flying platforms, Ground effect, Power, Reduction, Military requirements, Mathematical analysis.) (Jets, Flaps, Lift, Drag, Aerodynamics.)

An experimental program for the development of a flexible flap for hydroskimmer type vehicles is described. A successful flexible flap configuration was developed. Calculations indicate that power requirements may be reduced by a factor of about 3 to 1.5 on a typical hydroskimmer vehicle operating at 60 knots. Data from a large-scale, two-dimensional model over a flat ground plane show that rigid flaps that extend both sides of the jets provide a substantial power saving over an unflapped model of otherwise identical configuration. Tests with various ratios of inner to outer flap length show that little performance is gained through the use of inner flaps. Dynamic tests of a series of different flexible flaps attached to the above model, but with the model mounted over a moving wave train, have demonstrated that a successful flexible flap configuration can be constructed. The power requirements of a typical hydroskimmer vehicle operating in two different sea states are predicted both with and without flaps. (Author)

AD-274 373 Div. 1, 14, 17
(TISTM/GEC) OTS price $4.60

Bendix Products Div., Bendix Corp., South Bend, Ind.
MATERIALS PROPERTY DATA.
Quarterly progress rept. no. 4 on Phase 1, 1 Jan-31 Mar 62,
by James W. Yates. Apr 62, 36p. incl. illus. tables.
(Contract AF 33(616)8086)

Unclassified report

DESCRIPTORS: (Aircraft, *Brake linings, Friction brakes, Metals, Alloys, Additives, *Ceramic materials, Refractory materials, Cermets, High temperature research, Friction, Tests.) (*Coatings, Steel (4130), *Corrosion inhibition, Metal coatings, Ceramic coatings, Cermets, Aluminum compounds, Adhesion, Corrosion tests.) Dynamometers.

This rept. includes:
MATERIALS PROPERTY DATA. Twelve months summary rept. on Phase 2, 1 Apr 61-31 Mar 62, by James W. Yates. Apr 62.

Contents:
High temperature-high friction materials
  Lining compositions
  Friction test dynamometer procedures
  Pressed and sintered lining data
High temperature-protective coatings
Corrosion resistant materials
  Corrosion resistant coating development
  Evaluation of aluminum-ceramic compounds

AD-274 382 Div. 1, 26
(TISTA/SEB) OTS price $5.60

General Dynamics/Convair, San Diego, Calif.
DEVELOPMENT OF A HIGH TEMPERATURE NUCLEAR-RADIATION-RESISTANT PNEUMATIC POWER SYSTEM FOR FLIGHT VEHICLES.
Quarterly rept., 25 Dec 61-24 Mar 62.
24 Mar 62, 49p. incl. illus. tables (Rept. no. ZR-1001-12; Rept. no. GDC-62-97)
(Contract AF 33(616)7582, Proj. 61085)
Unclassified report

DESCRIPTORS: (*Pneumatic servomechanisms, *Pneumatic systems, Shielding from Nuclear energy, Radiation damage, High temperature research, Thermal radiation.) Pneumatic valves, Pressure regulators, Seals, Pipe fittings, Breather tubes, Valves, Servo motors, High pressure valves, Check valves, Impellers, Compressors, Aircraft equipment, Aircraft, Ramjet engines, Nuclear propulsion, Supersonic planes.

The development of components for the high-temperature and nuclear-radiation-resistant pneumatic system has been satisfactory. Some setbacks were encountered in connection with servo control valve stability, welding of the accumulator and sintering of the filter element. The first phase of the tube fitting and boss seal evaluation was completed. Based on this limited testing program, one tube fitting and one boss seal showed promise for use in the high-temperature pneumatic system. (Author)

AD-274 394 Div. 1, 9
(TISTA/LSK) OTS price $7.60

General Dynamics/Convair, San Diego, Calif.
STUDY OF LOADS AND MOTIONS OF TWO TYPES OF GROUND EFFECT MACHINES,
by S. T. Uyeda. 1962, 68p. incl. illus. 7 refs.
(Rept. no. ZH-150)
(Contract NObs-4360)
Unclassified report

DESCRIPTORS: (*Flying platforms, Ground effects, Aerodynamic configurations, Load distribution, Motion, Pitch, Roll, Acceleration, Flight testing over Water.)

Results are presented for dynamically similar experimental model evaluations of the over water loads and motions of two ground effect machine configurations. Two basic configurations were tested: (1) The DTMB Annular Jet Configurations; and (2) the Bureau of Ships Side Skeg Configurations. The program consisted primarily of determining the heaving and pitching motions incurred during normal operation in smooth water and in various regular wave conditions. Also, the rigid body load factors resulting from sudden power failure during maximum cruising condition in waves were determined. It is concluded that GEM vehicles operating over waves are subject to critical heaving and pitching motions and accelerations. These motions and accelerations are of paramount importance to the feasibility of the GEM concept during over-water operation. The results indicate that much can be done to minimize the motions and loads of these vehicles. Data were gained for the judicious selection of optimum design parameters. The tests also indicated some of the major problem areas which will require further investigation to insure the safety, structural integrity, and comfort of GEM vehicles operating over waves. (Author)

2. ASTRONOMY, GEOPHYSICS AND GEOGRAPHY

AD-273 965 Div. 2
(TISTP/FR) OTS price $1.10

4th Weather Wing, Colorado Springs, Colo.
AN OBJECTIVE AID FOR FORECASTING STRONG AND GUSTY SURFACE WINDS AT STEAD AFB, NEVADA,
by Thomas H. Simmonds. Mar 62, 4p. illus.
Unclassified report

DESCRIPTORS: (Airports, Air Force, Nevada, *Gusts, Weather forecasting.)

An objective aid for forecasting the occurrence of operationally critical values of strong surface winds with accompanying gusts at Stead AFB, Nevada, is presented. (Author)

AD-273 999 Div. 2, 20
(TISTP/FR) OTS price $3.60

Air Force Cambridge Research Labs., Bedford, Mass.
THE FORMATION OF IONS IN THE UPPER ATMOSPHERE,
by Robert E. Huffman. Nov 61, 26p. incl. illus. tables, 36 refs. (GRD Research notes no. 66; AFCRL-851)
(Proj. 7635)
Unclassified report

DESCRIPTORS: (*Ionosphere, *Ions, Electrons, *Photoelectric effect, Ultraviolet radiation, Oxygen, Nitrogen, Nitrogen compounds, Oxides.)

The present state of our knowledge concerning the formation of positive and negative ions in the earth's normal ionosphere is reviewed. The main process by which positive ions and electrons are formed in the ionosphere is photoionization of neutral constituents by solar vacuum ultraviolet radiation. Negative ions are formed primarily by direct attachment of electrons to certain neutral constituents. Existing values of the cross sections and rate coefficients of these processes are presented and gaps in the present knowledge are discussed. (Author)

AD-274 017 Div. 2, 8
(TISTP/FR) OTS price $11.00

New Mexico U., Engineering Experiment Station, Albuquerque.
A SYSTEM FOR RECORDING ELECTROMAGNETIC ATMOSPHERIC NOISE IN 3-50 CPS REGION,
by James F. White. Jan 62, 142p. incl. illus. table, 87 refs. (Technical rept. no. EE-69)
(Contract Nonr-279801)
Unclassified report

DESCRIPTORS: (*Atmospherics, *Extremely low frequency, Measurement, Instrumentation.) (Magnetic recording systems, Audiofrequency oscillators, Pulse generators, Rotary switches, Loop antennas, Low pass filters.) New Mexico.

Instrumentation was developed to secure noise data in the 3 to 50 cps portion of the spectrum and, at the same time, to seek evidence of the Schumann frequencies in this region. A frequency translation technique is employed during recording. During playback, the data is again translated and restored to its normal position in the spectrum. A test signal is used to ensure that in the record mode the gain is maintained within 1.2 db. Under this restriction, test

tapes recorded at frequencies in the 3 to 50 cps range indicate the gain from the antenna input during record to the the receiver output during playback. The over-all response in this frequency range is the response of the receiver, i.e., within 3 db. (Author)

AD-274 018 Div. 2, 8
(TISTP/FR) OTS price $3.60

New Mexico U., Engineering Experiment Station, Albuquerque.
MEASUREMENTS OF ELECTROMAGNETIC ATMOSPHERIC NOISE IN THE 3-50 CPS REGION,
by James F. White. Feb 62, 26p. incl. illus. 6 refs. (Technical rept. no. EE-70: Suppl. to Technical rept. no. EE-69, AD-274 017)
(Contract Nonr-279801)
Unclassified report

DESCRIPTORS: (*Atmospherics, *Extremely low frequency, Measurement.) Earth-ionosphere cavity mode frequencies.

Evidence of earth-ionosphere cavity mode frequencies was experimentally obtained. The results indicate that the lower mode frequencies are f1 is approx. 8.5 cps, f2 is approx. 15.5 cps, and f3 is approx. 22.6 cps. The comparatively small amount of data secured during the evening hours precludes noting any change in the mode frequencies due to changes in ionosphere height or conductivity. (Author)

AD-274 033 Div. 2
(TISTP/FR) OTS price $4.60

Washington U., Seattle.
DETAILED ANALYSES OF SELECTED PACIFIC STORMS BASED ON CONTINUOUS RADAR RECORDS AND SHORT-INTERVAL SERIAL ASCENTS. VOLUME I. CASE OF JANUARY 6-8, 1961,
by Richard J. Reed. Dec 61, 44p. incl. illus. tables, 1 ref. (Technical rept. no. 3)
(Contract AF 19(604)5192, Proj. 8641)
(AFCRL 62-242) Unclassified report

DESCRIPTORS: (Pacific Ocean, *Storms, Cyclones, Radar analysis, *Meteorological radar.) (Washington, Meteorological data.)

Preliminary study of Pacific storm systems by means of routine synoptic data and continuously recorded radar echoes revealed a considerable diversity and fluctuation of echo types in relation to synoptic features and much complexity and deviation from ideal models in the storm structures. To clarify certain puzzling aspects of the wind and temperature (frontal) structures and to seek an explanation for the seemingly erratic changes in echo character, a program of short-interval, serial ascents was inaugurated in January 1961. During the remainder of the winter and the ensuing spring, five series of observations of one to three days duration were undertaken in which radiosondes were released as frequently as once an hour, while the radar echoes from an AN/APQ-39, 1.87 cm vertical-beam radar, were being continuously recorded on film strip. (Author)

AD-274 076 Div. 2, 8
(TISTP/JW) OTS price $7.60

Antenna Lab., Ohio State U. Research Foundation, Columbus.
IONOSPHERIC STUDIES USING POLARIZATION ROTATION OF SATELLITE RADIO SIGNALS,
by Byron C. Potts. 24 Jan 62, 69p. incl. illus. tables, 43 refs. (Rept. no. 1116-16; Scientific rept. no. 11)
(Contract AF 19(604)7270, Proj. 4649)
(AFCRL 62-155) Unclassified report

DESCRIPTORS: (Magneto-optic rotation with respect to Radiofrequency, Electromagnetic waves originating from *Satellite vehicles.) (Magneto-optic rotation, Electrons, Density in *Ionosphere.)

The polarization rotation is studied for radio signals received from an artificial satellite in the ionosphere. A first-order analysis is used which leads to values for the integrated electron density in the ionosphere. These values are compared with those calculated by other means and with those obtained by other investigators. A new parameter, the rate of polarization null position, is introduced as a method for obtaining the electron density at satellite altitudes. The methods employed in the analysis are outlined and additional means of improving the analysis are discussed. (Author)

AD-274 080 Div. 2, 8
(TISTP/FR) OTS price $9.10

United Electrodynamics, Pasadena, Calif.
FIELD STUDY OF VARIATION IN CHARACTERISTICS OF SEISMIC NOISE AND SIGNALS WITH GEOLOGIC AND GEOGRAPHIC ENVIRONMENT.
Semiannual progress rept., 1 July-31 Dec 61,
by J. R. Woolson. 5 Feb 62, 1v. incl. illus. 13 refs. (Rept. no. AAD 62-19)
(Contract AF 33(600)42048, Proj. VT/078-16)
Unclassified report

DESCRIPTORS: (*Seismological stations, Seismographs, *Seismic waves, Background noise, Geophysics, Geology, California, Washington.)

The method of establishing noise levels and relative signal response of the various sites occupied (10 in California) consists of using two essentially identical tripartite seismic recording systems, one fixed and one which is relocated about once a month. The fixed station is the master and the relocated station is the slave. The triangular array of short period seismometers at the slave station is expanded at one week intervals from 1/4 mile from a central point by 1/4 mile intervals to a total central distance of one mile. The results are simultaneously recorded on film and magnetic tape and brought to an analysis office for processing. (Author)

AD-274 106 Div. 2, 22
(TISTW/EET) OTS price $8.60

Acoustics and Seismics Lab., U. of Michigan, Ann Arbor.
DEEP-BOREHOLE SEISMIC RESEARCH.
VESIAC Special rept.,
by Louise Snider. Mar 62, 90p. incl. illus. tables, 4 refs. (Rept. no. 4410-16-X)
(Contract SD-78)
Unclassified report

DESCRIPTORS: (Detection of *Underground explosions, Earthquakes, Explosions by *Seismographs.) *Seismic waves, Electromagnetic waves, Measurement, Ocean bottom, Geology, Great Britain.

A compilation of status reports on the deep borehole research program by VELA UNIFORM contractors are presented. Detailed information is given on instrumentation, seismic measurements, buried arrays, ocean-bottom seismometers, and the United Kingdom borehole program. Diagrams, charts, and other illustrative material is included. Recommendations for future work are given by some authors. (Author)

AD-274 155 Div. 2, 30
(TISTP/TL) OTS price $3.00

Institute of Science and Tech., U. of Michigan, Ann Arbor.
PROCEEDINGS OF THE FIRST SYMPOSIUM ON REMOTE SENSING OF ENVIRONMENT 13, 14, 15 FEBRUARY 1962.
Mar 62, 149p. incl. illus. refs. (Rept. no. 4864-1-X)
(Contract Nonr-122444)
Unclassified report

DESCRIPTORS: (*Symposia, *Geophysics.) (Measurement of Physical properties with respect to Earth by Spectrographic analysis of Electromagnetic waves.)

These proceedings resulted from the first symposium on remote sensing of environment. The purpose of the symposium is to review the current state of the art of remote sensing technology and to explore possible applications of this technology to the various earth science fields. These proceedings contain both the discussions of the remote sensing techniques and the working papers written in response to these discussions by each of the three working groups composed of the participating earth scientists. (Author)

AD-274 169 Div. 2, 12
(TISTA/LSK) OTS price $.75

National Aeronautics and Space Administration, Washington, D. C.
THE NASA PROGRAM FOR PARTICLES AND FIELDS RESEARCH IN SPACE,
by George H. Ludwig. Apr 62, 26p. incl. illus. table, 32 refs. (Technical note D-1173)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1173.

Presented at Scoula Internazionale di Fisica Enrico Fermi, Varenna sul Lago di Como, May 23-June 3, 1961.

DESCRIPTORS: (*Satellite vehicles, Space probes, Instrumentation for Measurement of *Cosmic rays, *Solar flares, Solar energy, Van Allen radiation belt, *Terrestrial magnetism in Upper atmosphere, Ionosphere, Space environmental conditions.) Astrophysics, Geophysics.

The early accomplishments in space are outlined with emphasis upon particle and field research. The four major groups of energetic charged particles-primary cosmic rays, energetic solar particles, the solar wind, and charged particles in geomagnetically trapped orbits near the earth are discussed and further investigation of Galactic cosmic rays, energetic solar flare particles, the solar plasma and the trapped radiation is recommended. The primary NASA launch vehicles of the present and the future are related to the experiments proposed. Some of the spacecraft planned for the future are also described. (Author)

AD-274 182 Div. 2, 25
(TISTP/JW) OTS price $4.60

Rand Corp., Santa Monica, Calif.
A CHARGE-SEPARATION MECHANISM FOR THE PRODUCTION OF POLAR AURORAS AND ELECTROJETS,
by J. W. Kern. Mar 62, 45p. incl. illus. table. (Research memo. no. RM-3058-NASA)
(Contract NASr-2105)
Unclassified report

DESCRIPTORS: (Drift of *Electrons and *Protons in Magnetic fields of Earth.) (*Terrestrial magnetism, Solar flares.) (Aurorae, *Electric fields and Space charges in Atmosphere.)

A mechanism for charge separation in the geomagnetically trapped radiation is described which may account for some observed phenomena associated with the polar aurora and the electrojet current systems. Surfaces of constant number density may be separated from surfaces of constant integral invariant within the trapped radiation as a result of distortion of the geomagnetic field by solar streams. Drift separation of protons and electrons will follow, and for irregular distributions of plasma number density, electric fields will arise. A direct consequence of such polarization of the geomagnetically trapped radiation will be the polar-electrojet current systems. The polar aurora arise where energetic particles are discharged from regions of excess charge within the geomagnetically trapped radiation. A model for the discharge of such auroral particles is discussed. An interesting feature of the proposed mechanism is that the extreme thinness of auroral sheets appears to follow as a natural consequence of charge separation. This is shown analytically for a simple two-dimensional model of a trapped plasma. (Author)

AD-274 191 Div. 2
(TISTP/FR) OTS price $8.10

Army Ordnance Missile Command, Redstone Arsenal, Huntsville, Ala.
MEAN WIND PROFILES BY WEATHER SITUATIONS. A CONTRIBUTION TO STRATIFIED CLIMATOLOGY,
by Oskar M. Essenwanger. 18 Dec 61, 84p. incl. illus. tables, 22 refs. (Rept. no. RR-TR-61-34)
Unclassified report

DESCRIPTORS: (*Wind, Statistical analysis.) Guided missile trajectories.

The dependence of the wind profile upon the weather situation was investigated. The weather situation was defined using a local parameter, namely, the mean stream flow within layers of the lower troposphere. It could be demonstrated that the stratification of the wind data by the defined weather situation displays distinct differences in the mean direction profiles and the median speed profiles below 14-20 km, while above 20 km there appears little difference for the wind profiles by weather type. The total wind error of the missile shot can be considerably reduced for some of the weather situations compared to the average condition; other situations, however, show more scatter and point towards unfavorable wind influence upon the missile shot. (Author)

AD-274 196 Div. 2
(TISTP/FR) OTS price $10.50

Army Ordnance Missile Command, Redstone Arsenal, Huntsville, Ala.
ABMA CLIMATOLOGICAL RINGBOOK. PART XIX. EMPIRI-

CAL FREQUENCY DISTRIBUTIONS OF PRESSURE, TEMPERATURE AND AIR DENSITY AT LEVELS OF CONSTANT ALTITUDE, VIENNA, AUSTRIA,
by Werner H. Alfuth and Armstead P. Alsobrook.
2 Nov 61, 139p. incl. illus. tables, 8 refs.
(Rept. no. RR-TR-61-23)
Unclassified report

DESCRIPTORS: (*Atmosphere, Barometric pressure, Statistical analysis, Temperature, Density, Austria, Handbooks.) Atmosphere models.

Climatological parameters of barometric pressure, air temperature and air density in relation to the ARDC Model Atmosphere 1959 at 1 km altitude intervals for Vienna, Austria are presented. The frequency distributions have been established for the twelve monthly and the annual reference periods with values of cumulative percentage frequency corresponding to the mean and plus and minus one, two and three sigma levels of normal distribution. The statistical information is based on the observational period March 1954 - February 1959. (Author)

AD-274 212 Div. 2
(TISTP/FR) OTS price $6.60

Air Force Cambridge Research Labs., Bedford, Mass.
A STUDY OF SACRAMENTO PEAK FLARES. II: FLARE AREAS AND IMPORTANCE CLASSIFICATIONS,
by Henry J. Smith and William D. Booton. May 61, 55p. incl. illus. tables (GRD Research notes no. 58; AFCRL-472)
Unclassified report

DESCRIPTORS: (*Solar flares, Statistical analysis.) Sunspots.

The Sacramento Peak flare observations provide an ideal sample of data with which to study the distribution of solar flare areas and the effects of geometric projection upon the area. The statistical properties of the areas of 7500 flares and subflares were examined to test correction procedures which take into account the sensible heights of flares. The criterion of any area rectification process was that it should render the area frequency function of flares invariant with central distance. One procedure, which was devised by C. S. Warwick and has been adopted by several American observatories, proved very successful. However, no objective formula can recover the area of a partially occulted flare right at the sun's limb. For such events an experienced observer's judgement is probably the best guide to a flare's importance. (Author)

AD-274 213 Div. 2
(TISTP/TL) OTS price $1.60

Air Force Cambridge Research Labs., Bedford, Mass.
ACCURACY OF DENSITY FROM THE ROBIN FALLING SPHERE,
by Robert Leviton and John B. Wright. Dec 61, 11p. incl. illus. 2 refs. (GRD Research notes no. 73; AFCRL-1095)
(Proj. no. 6670)
Unclassified report

DESCRIPTORS: (*Falling bodies, *Spheres, Measurement of Atmosphere, Density by *Radar tracking.) *Atmospheric sounding.

Atmospheric density from about 200,000 ft down to 100,000 ft can be obtained by radar track of the ROBIN sphere as it falls toward the ground. An analysis is made of the various sources of error in the system including the equations of motion, drag-coefficient evaluation, radar-position data, and computational techniques to determine their effect on the accuracy of the calculated densities. Some ROBIN density data are presented. (Author)

AD-274 240 Div. 2
(TISTP/FR) OTS price $2.60

4th Weather Group, Eglin Air Force Base, Fla.
VARIATION OF STRONG WIND SPEEDS WITH HEIGHT FROM 30 to 500 FEET.
15 Feb 62, 20p. incl. illus. tables, 20 refs.
(4WG Pamphlet no. 105-12-1)
Unclassified report

DESCRIPTORS: (*Wind, *Gusts, Hurricanes, Velocity.)

A study of vertical wind data obtained from various locations is presented to solve the problem of strong wind variability with height at Patrick AFB, Florida. (Author)

AD-274 254 Div. 2
(TISTP/FR) OTS price $8.10

Midwest Research Inst., Kansas City, Mo.
INVESTIGATION OF TECHNIQUES FOR REMOTE MEASUREMENT OF ATMOSPHERIC WIND FIELDS.
Rept. no. 2, 15 Oct 61-14 Feb 62 on Phase 2: Analysis,
by R. W. Fetter, P. L. Smith, Jr. and others.
14 Feb 62, 77p. incl. illus. tables, refs.
(Contract DA 36-039-sc-87293)
Unclassified report

DESCRIPTORS: (*Wind, Measurement, Instrumentation, Feasibility studies.) (Turbulence, Radar, *Doppler tracking.) (Radar, Doppler tracking, *Acoustic detectors.) (Air, Heat, Bubbles, *Infrared tracking.)

Analyses were made to determine the feasibility of three proposed methods of remote wind measurement using (1) scattering from natural atmospheric turbulence; (2) electromagnetic scattering from acoustic waves; and (3) infrared tracking of an artificially heated volume of air (bubble) Use of natural turbulence as a sensor will require (1) additional data on distribution and characteristics of turbulence from ground level to one mile altitude, (2) correlation of turbulence motion and wind, and (3) radar state-of-the-art improvement to provide consistent detection and measurement. Remote wind measurements by microwave reflection from acoustic waves have been demonstrated, but additional experimental data are needed to determine maximum usable range and the effects of turbulence on the acoustic waves. Remote generation of a heated bubble of air does not appear feasible. (Author)

AD-274 261 Div. 2
(TISTP/FR) OTS price $2.60

Bowling Green State U., Ohio.
METHODOLOGY FOR INSTRUMENTED GEOGRAPHIC ANALYSIS,
by James P. Latham. Mar 62, 25p. incl. illus. table, 13 refs. (Technical rept. no. 2)
(Contract Nonr-300401, Proj. NR 387-023)
Unclassified report

DESCRIPTORS: (Aerial photographs, Maps, Analysis, *Geography.)

The complex geographic patterns of phenomena now recorded or transmitted by aerial photography, infrared scanners, or other image or environmental sensors provide distribution data which require rapid and rigorous methods of quantitative analysis. A Rotated-Parallel-Traverses method measures aspects of the distributants' size, shape, orientation, extension, fragmentation, and dispersion. It provides data for estimating the area of simple or complexly-shaped units or regions, and for estimating proportion of total area occupied by each phenomena present. Statistical and graphically expressed descriptions of distribution can be mapped, sometimes automatically. Patterns produced by the same phenomenon in different regions, or by different phenomena in the same regions, can be quantitatively compared and described by curves or symbols, such as the orientation rose. The isolated and quantified data of distribution permits scientific evaluation of spacial and causal relationships. Probable journey experience over areas may be statistically or graphically expressed for planning or descriptive purposes. (Author)

AD-274 267 Div. 2
(TISTP/FR) OTS price $2.60

RAND Corp., Santa Monica, Calif.
CAUSE OF THE PRELIMINARY REVERSE IMPULSE OF STORMS,
by E. H. Vestine and J. W. Kern. Mar 62, 23p. incl. illus. 20 refs. (Memo. no. RM-3085-NASA)
(Contract NASr-2105)
Unclassified report

DESCRIPTORS: (Ionosphere, Electric currents, *Ionospheric disturbances, *Magnetic storms, Plasma physics.)

Two equivalent ionospheric-current systems, derived for magnetic disturbances associated with the onset of geomagnetic storms, are examined. The first current system is that given by Nagata and Abe (1955) for preliminary reverse impulse at 6h 25m GMT, May 29, 1933. The second current system is for the polar part of the averaged sudden commencement (SC) as given by Jacobs and Obayashi (1956). Electric-charge distributions which would drive these current systems are derived from potential analyses. Finally, the interaction between an approaching solar stream and the magnetosphere is discussed. It is shown that a simple extension of the Chapman-Ferraro theory can provide the observed polar charge distributions. (Author)

AD-274 269 Div. 2
(TISTP/GRW) OTS price $4.60

Colorado State U. Research Foundation, Fort Collins.
THE NATURE OF CLEAR-AIR TURBULENCE (CAT).
Scientific interim rept.,
by Elmar R. Reiter and Robert W. Hayman. Feb 62, 34p. illus. 26 refs. (Atmospheric science technical paper no. 28; Rept. no. CER62ERR11)
(Contract N189(188)538-28A)
Unclassified report

DESCRIPTORS: (Configuration of *Clouds by Aerial photography and Mapping techniques using *Aerial cameras.) (*Aircraft, *Turbulence, Gust loads, Flight paths.)

This report includes:
A PHOTOGRAMMETRIC STUDY OF CLOUD STRUCTURE ASSOCIATED WITH CLEAR-AIR TURBULENCE. Scientific interim technical rept., pt. 1, by Robert W. Hayman. Feb 62.

ON THE NATURE OF CLEAR-AIR TURBULENCE (CAT). Scientific interim rept., pt. 2, by Elmar R. Reiter. Feb 62.

The application of tested photogrammetric principles to the study of cloud configurations appears to be a most practical method of defining a transient and complex system. Relative accuracies of the photogrammetric methods seem to be well within the requirements of dimensional definition. Absolute accuracy of the system probably warrants further refinement. Cost of these evaluation procedures, exclusive of development, are low enough to allow the continued application of the photogrammetric approach to problems of this nature. (Author)

AD-274 273 Div. 2
(TISTP/FR) OTS price $2.60

Astrophysical Observatory, Smithsonian Institution, Cambridge, Mass.
PRELIMINARY ANALYSIS OF THE ATMOSPHERIC DRAG OF THE TWELVE-FOOT BALLOON SATELLITE (1961 Delta 1). Rept. on Research in Space Science,
by Luigi G. Jacchia and Jack Slowey. 9 Feb 62, 19p. incl. illus. tables, 8 refs. (Special rept. no. 84)
(Sponsored by U. S. Air Force and National Aeronautics and Space Administration)
Unclassified report

DESCRIPTORS: (*Satellite vehicles, Atmosphere, *Drag, Periodic variations, Terrestrial magnetism, Solar energy, Tables.)

Accurate values of the atmospheric drag for the Explorer IX Satellite (1961 Delta 1) were computed at one-day intervals, except during magnetically perturbed days when the interval was 0.5 days. Atmospheric densities at perigee were derived by numerical integration of the drag equation, using a rotating model atmosphere with oblateness and diurnal bulge. Atmospheric temperatures were derived from Nicolet's helium-topped, diffusion-equilibrium model with asymptotically isothermal temperature profiles (Nicolet, 1961). The temperatures derived from this satellite are in good agreement with the temperatures obtained from several other satellites during the same time interval. (Author)

AD-274 322 Div. 2, 22
(TISTP/JW) OTS price $2.60

Naval Ordnance Lab., White Oak, Md.
A LIGHTNING STRIKE OF AN UNDERWATER EXPLOSION PLUME,
by George A. Young. 1 Feb 62, 22p. incl. illus. tables, 7 refs. (Rept. no. NOLTR 61-43)
Unclassified report

DESCRIPTORS: (Photographs of *Lightning, Water, Water vapor, *Underwater explosions, Conductors, Pulse generators, Electric fields, Electric discharges.)

An unexpected lightning strike to an underwater

explosion plume is described. Four pulses occurred, lasting a total of one second. Photographic evidence indicates that the discharge probably started upward from the plume. The occurrence provides support for the viewpoint that the rapid introduction of a conductor into the electric field of a storm would be a useful experimental technique for triggering a lightning stroke.

AD-274 324 Div. 2
(TISTP/FR) OTS price $4.60

National Aeronautics and Space Administration, Washington, D. C.
SPECTRAL, ELECTROPHOTOMETRICAL AND RADAR RESEARCHES OF AURORAE AND AIRGLOW (Spektral'nyye, Elektrofotometricheskiye i Radiolokatsionnyye Issledovaniya Polyarnykh Siyaniy i Svecheniya Nochnogo Neba),
by V. I. Krasovskiy. Apr 62, 36p. incl. illus. tables, 65 refs. (Technical trans. F-76, from IGY Program, Section IV, No. 1, Academy of Sciences, USSR, 1959)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical trans. F-76.

DESCRIPTORS: (*Aurorae, *Spectrographic analysis, Measurement, Spectrophotometers, Hydrogen, Radio signals, Reflection.) (*Sky brightness, Spectrographic analysis.)

Contents:
Hydrogen emission and two types of auroral spectra
Observation of the aurora on 10 and 11 February, 1958 near Moscow
Intensity of some emissions of the twilight and night sky
Electrophotometric measurements in the auroral zone
An attempt at interferometrical study of auroral emission lines
On the observations of the line Lambda 6562 angstroms in the spectrum of the night sky
Some results of spectroscopic investigations of auroral and night glow spectra

AD-274 336 Div. 2
(TISTP/FR) OTS price $3.60

Ionosphere Research Lab., Pennsylvania State U., University Park.
THE INTERPLANETARY MAGNETIC FIELD AND THE AURORAL ZONES,
by J. W. Dungey. 15 Mar 62, 29p. incl. illus. 3 refs. (Scientific rept. no. 157)
(Contract AF 19(604)4563)
(AFCRL 62-423) Unclassified report

DESCRIPTORS: (*Terrestrial magnetism, Plasma physics, Protons.) (*Ionosphere, Electric fields.)

It was found that a model with a southward interplanetary magnetic field leads to a natural explanation of the SD currents. Speculative aspects of the problem as they appear at this time are discussed. It should be remembered that this problem is amenable to revolutionary progress by observations from rockets or satellites which go out more than a few earth's radii. (Author)

AD-274 360 Div. 2
(TISTP/GRW) OTS price $2.60

Army Signal Research and Development Lab., Fort Monmouth, N. J.
THEORETICAL CONSIDERATIONS ON THE EFFECTIVENESS OF CARBON SEEDING,
by Robert Fenn and Hansjorg Oser. Mar 62, 30p. incl. illus. table, 14 refs. (ASRDL technical rept. no. 2258)
(In cooperation with National Bureau of Standards, Washington, D. C.)
Unclassified report

DESCRIPTORS: (Reduction of *Clouds by *Artificial precipitation.) (Carbon, *Particles for seeding.) (Light, Scattering, Absorption.)

Presented are some results of machine computations of the scattering functions, the extinction-, scattering-, and absorption-coefficients for pure absorbing carbon particles, and the compound carbon particles with concentric water shell of varying thickness; and an analysis of the absorption properties of various single particles. The scattering and absorption properties of single particles are used to calculate the absorptivity, transmissivity, and reflectivity of three cloud models: a pure carbon particle cloud, a cloud of water droplets and carbon particles, and a cloud of compound concentric carbon-water particles. All three clouds are 1000 meters thick and near the ground. (Author)

AD-274 376 Div. 2
(TISTP/FR) OTS price $1.60

Colorado State U. Research Foundation, Fort Collins.
A CASE STUDY OF SEVERE CLEAR-AIR TURBULENCE,
by Elmar R. Reiter. Mar 62, 12p. illus. 10 refs. (Atmospheric Science technical paper no. 30)
(Contract N189(188)55120A)
Unclassified report

DESCRIPTORS: (Atmosphere, *Turbulence, *Aviation accidents.) (*Jet streams (Meteorology), Wind, Temperature.) Gravity.

On January 19, 1961, 1816 MST (January 20, 0116 GCT), a B-52 aircraft was lost in severe clear-air turbulence (CAT) over northwestern New Mexico. The weather conditions in the upper troposphere and lower stratosphere at the time of the accident are described. A working hypothesis on the formation of CAT proposed in previous papers is in good agreement with the data presented. (Author)

AD-274 380 Div. 2, 8
(TISTP/FR) OTS price $9.10

Denver Research Inst., Colo.
STUDY OF GEOMAGNETIC FLUCTUATIONS (1 TO 50 CPS). Final rept.,
by George L. Mason, H. C. Westdal, and Charles R. Higgins. 1 Nov 61, 96p. incl. illus. tables, 20 refs.
(Contract AF 19(604)2204, Proj. 8601)
(AFCRL 62-238) Unclassified report

DESCRIPTORS: (*Terrestrial magnetism, Measurement.) (*Fluxmeters, Magnetic amplifiers, Audiofrequency, Audiofrequency oscillators, Timing circuits, Calibration, Electronic circuits, Detectors.) (Terrestrial magnetism, Meteors.)

A continuing study of fluctuations of the earth's magnetic field is described. Its purpose has been to record and analyze fluctuations within the frequency range 1 to 50 cycles per second. Analysis is directed toward relating these fluctuations to specific causes. Three orthogonal components are recorded. Data has been obtained for various periods up to a year or more from individual recording stations at College, Alaska; Ft. Devens, Massachusetts; Thule, Greenland; Mt. Evans, Colorado; Huancayo, Peru; and Shickley, Nebraska. Reduction of data to digital form is accomplished by a semi-automatic data-processing system. Output of the system is a series of numbers representing mean hourly activity within six one-octave bands for each component. These bands are centered at 1.5, 2.75, 5.0, 10.0, 20.0 and 40.0 cycles per second. Part of the available data has been reduced and a start made on its analysis. There appears to be a positive correlation between meteor activity and geomagnetic fluctuations in the 1 to 2 cycle per second range, which is to be studied further. (Author)

This report summarizes and applies to field use research data obtained on the removal of chemical, biological, and radiological agents from water. It concludes: (a) Most significant CW agents in water can be detected satisfactorily with the AN-M2 kit; however, the kit does not have a V-agent capability; (b) RW agents in water can be detected with the standard IM-141/PDR-27J Radiacmeter; (c) onsite detection of BW agents in water in the field is not feasible; (d) a proposed General CW-BW Water Decontamination Procedure is effective for inactivating all known significant CW agents in water and for destroying exceptional chlorine-resistant BW agents; (e) standard water purification equipment is effective in removing sparingly soluble radioactive nuclear bomb debris from water; a mobile ion exchange unit is under development for removing soluble activity; (f) distillation is an effective process for decontaminating water; (g) in the event of CBR attack, ground water should be free of contamination and considered as a first choice in the development of water sources.

3. CHEMICAL WARFARE EQUIPMENT AND MATERIALS

AD-274 245 Div. 3, 13, 18
(TISTB/LH) OTS price $6.60

Hughes Aircraft Co., Fullerton, Calif.
FEASIBILITY AND DESIGN STUDY FOR COLLECTIVE PROTECTION EQUIPMENT FOR THE AN/MSG-4 SYSTEM.
Final rept., 15 Mar 62, 75p. incl. illus. table.
(Rept. no. FD 62-75)
(Contract DA 18-108-cml-6618)
Unclassified report

DESCRIPTORS: (*Antiaircraft defense systems, *Shelters, *Particle filters, *Radar trailers, Portable shelters, Air conditioning equipment, Safety devices, Pneumatic devices, Trailers, Vehicles, Installation, Design.) (Aerosols, Biological warfare, Chemical warfare, Radiological warfare.)

AD-274 300 Div. 3, 2
(TISTB/CCH) OTS price $7.60

Army Engineer Research and Development Labs., Fort Belvoir, Va.
REMOVAL OF CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL CONTAMINANTS FROM WATER WITH CORPS OF ENGINEERS FIELD WATER SUPPLY EQUIPMENT.
Summary rept., 1 Jan 51-1 Oct 61 on Purification of Water Contaminated with Radioactive Material, by Don C. Lindsten and Richard P. Schmitt.
12 Dec 61, 66p. incl. illus. tables (Research rept. no. 1702-RR)
Unclassified report

DESCRIPTORS: (*Water supplies, *Water, *Decontamination, Chemical warfare agents, Biological warfare agents, Radiological warfare agents.) (Detection, Purification, Sanitary engineering, Water filters, Decontamination kits, Protective clothing.)

4. CHEMISTRY

AD-273 978 Div. 4, 25
(TISTM/EJH) OTS price $1.60

Union Carbide Corp., Parma, Ohio.
MASS SPECTROMETRIC STUDY OF THE VAPORIZATION OF THE Ti-B SYSTEM,
by P. O. Schissel and O. C. Trulson. 5 Feb 62, 24p. incl. illus. table, 16 refs. (Research rept. no. C-11)
(Contract DA 30-069-ORD-2787; In cooperation with Union Carbide Research Inst., Tarrytown, N. Y.)
Unclassified report

DESCRIPTORS: (*Titanium compounds, *Borides, *Refractory materials, Thermodynamics, *Vaporization, Heat of formation, Heat of sublimation, Thermochemistry, Decomposition, Mass spectroscopy, High temperature research.)

A mass spectrometer was used with Knudsen cells to study the vaporization of the titanium-boron system. The pressures of Ti(g) and B(g) were determined over several condensed phases and yielded values of 430 kcal/mole and -52 kcal/mole for the heats of vaporization and formation of TiB2, respectively. Thermodynamic functions for TiB(s) were obtained. (Author)

AD-274 056 Div. 4, 25
(TISTM/EJH) OTS price $5.60

Noyes Chemical Lab., U. of Illinois, Urbana.
NMR STUDIES OF CONFORMATIONAL EQUILIBRIA IN SUBSTITUTED ETHANES,
by H. S. Gutowsky, Geneva G. Belford, and P. E. McMahon. 30 Jan 62, 53p. incl. illus. tables, 29 refs. (Technical rept. no. 47)
(Contract Nonr-183413, Proj. NR 051-215)
Unclassified report

DESCRIPTORS: (*Ethanes, *Halocarbons, *Fluorides, Chlorides, Bromides, Substitutes, Isomer, Nuclear magnetic resonance, Infrared spectroscopy, Molecular spectroscopy, Chemical bonds, Theory, Temperature.) Atoms, Fluorine, Protons, Resonance.

Proton and fluorine magnetic resonance spectra were observed in 12 liquid polysubstituted ethanes over temperature ranges of 250 to 450 K. In each of these compounds, reorientations about the C-C bond are fast enough to yield high resolution nmr spectra which are averages of the three rotational isomers. The change in the proportions of the isomers with temperature is large enough for the case of some of the isomers for which J sub HF has been reported, to permit a least-squares type analysis of the averaged shifts (V) and coupling constants (J) with a high-speed digital computer. The latter evaluates the physical parameters, 3 or 5 depending upon molecular symmetry, which govern the temperature dependence of (V) and (J). These parameters are the values of the spectral quantity in question for each of the rotomers, and the relative energies of the latter. (Author)

AD-274 090 Div. 4, 25
(TISTM/GEC) OTS price $4.60

Boeing Scientific Research Labs., Seattle, Wash.
THE ELECTRONIC STRUCTURE OF DECABORANE-14,
by Emmett B. Moore, Jr. Feb 62, 45p. incl. illus. 25 refs. (Rept. no. D1-82-0085)
Unclassified report

Also available from the author.

DESCRIPTORS: (*Decaboranes, *Molecular structure, Polarization, Atomic orbitals, Dipole moments, Mathematical analysis.)

A linear combination of atomic orbitals treatment of the 22 framework atomic orbitals and 16 framework electrons of decaborane-14 yielded 8 bonding molecular orbitals with energies between -14.0 and -11.1 ev. An electron population analysis yielded a charge of +0.41e on B atoms 6 and 9, +0.01e on 5,7,8, and 10,-0.10e on 1 and 3, and -0.33e on 2 and 4. This charge distribution agreed satisfactorily with the charge distribution inferred from the reactions of decaborane-14 and gives a dipole moment of 7.3 D. If -0.2e is assigned to each bridge H, the dipole moment becomes 3.8 D, compared with the experimental value of 3.5 D. The polarizations of the first 2 allowed electronic transitions agreed with the observed polarization, and the energy of the highest filled molecular orbital agreed satisfactorily with the observed ionization energy. (Author)

AD-274 119 Div. 4
(TISTM/GEC) OTS price $14.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
THE COMPLEX COMPOUNDS OF TRANSURANIUM ELEMENT,
by A. D. Gel'man, A. I. Moskvin and others.
30 Mar 62, 208p. incl. illus. tables, refs.
(Trans. no. FTD-TT-61-246 of Kompleksnyye Soyedineniya Transuranovykh Elementov, Moscow, 223p., 1961)
Unclassified report

DESCRIPTORS: (*Complex compounds, *Transuranic elements, Chemical properties, Separation, Precipitation, *Neptunium compounds, *Plutonium compounds, Americum compounds, Curium, Berkelium, California.) Bibliography.

Contents:
Complexation of Np in aqueous solutions
  Complexation of Np (III), (IV), (V), and (VI)
  Np complexes isolated in solid form
Plutonium complexation in aqueous solutions
  Complex compounds in aqueous solutions
  The hydrolysis of hydrated Pu ions having various oxidation states
  The formation of acido complexes of Pu in various oxidation states
  Certain physicochemical properties of Pu compounds in aqueous solutions
  The redox properties and complexation of Pu ions
The synthesis and properties of certain complex compounds of tri-, tetra-, and hexavalent Pu
  Acido complexes of trivalent Pu, tetravalent Pu, and hexavalent Pu
  Some slightly soluble Pu compounds
The complexation of transplutonium elements in solutions
  The complexation of Am, Cm, Bk, Cf, Es, Fm, and Md
The use of complex compounds to isolate and separate transuranium elements
  The isolation of Pu and Np from irradiated U
  The isolation and identification of transplutonium elements

AD-274 160 Div. 4
(TISTM/EJH) OTS price $6.60

Lund U. (Sweden).
TECHNICAL NOTES NO. 7-11,
by Kj. Rosengren, S. Sunner, and D. Timm.
15 Jan 62, 65p. incl. illus. tables, 66 refs.
(Contract AF 61(052)46)
(AFOSR-2327) Unclassified report

DESCRIPTORS: (Mixtures, *Hydrocarbons, *Glass, *Low temperature research, Freezing, Physical properties, Viscosity, Melting.) (Pentanes, Hexanes, Cyclohexanes.) (Alkyl radicals, *Sulfides, *Thiols, *Iodine, Ethyl radicals, Hydrogen compounds, *Iodides, Organic solvents, Hydrocarbons, *Photolysis, Photochemical reactions.)

This report includes:
A STUDY OF CONTRACTION, RELATIVE VISCOSITY AND MELTING CURVES OF SOME GLASS-FORMING HYDROCARBON MIXTURES, by Kj. Rosengren.

SOME NEW GLASS-FORMING HYDROCARBON MIXTURES, by Kj. Rosengren and S. Sunner.

A SYSTEMATIC STUDY OF THE PHOTOLYSIS OF SOME DIALKYL DISULFIDES IN A RIGID GLASS AT 77 DEGREES K, by Kj. Rosengren.

THE PHOTOLYSIS OF ALKANETHIOLS IN A RIGID GLASS AT 77 DEGREES K WITH THE POSSIBLE FORMATION OF THIYL RADICALS, by Kj. Rosengren.

THE PHOTOLYSIS OF IODIDE, ETHYL IODIDE AND HYDROGEN IODIDE IN A RIGID GLASS AT 77 DEGREES K, by D. Timm.

5. COMMUNICATIONS

AD-274 243 Div. 4, 25
(TISTM/EJH) OTS price $2.60

Hughes Tool Co., Culver City, Calif.
INFRARED SPECTRA AND THERMODYNAMIC PROPERTIES OF TRIFLUOROBOROXINE, (FBO3)..
Final rept., Jan-June 61,
by H. D. Fisher, J. Kiehl, and A. Cane. June 61, 18p. incl. illus. tables, 17 refs. (Rept. no. HTC-61-90)
(Contract AF 33(616)6781)
Unclassified report

DESCRIPTORS: *Fluorides, *Boron compounds, *Oxides, Labeled substances, Boron, Isotopes, Synthesis, Chemical reactions, Disproportionation, Decomposition, Thermochemistry, Heat of reaction, Heat of formation, Entropy, Reaction kinetics, Infrared spectroscopy, Low temperature research, High temperature research.

IR spectra of isotopically-normal and B-10-enriched trifluoroboroxines were taken of samples prepared by the high-temperature (500 C) reaction of isotopically labeled BF3 and SiO2 followed by quenching at -150 C. (FBO)3 disproportionates above -135 C to BF3 and B2O3. Spectra of the labeled trifluoroboroxines and their resulting boric oxides are presented. By use of Ar windows in a high-temperature IR cell the B-O-F system was examined at various temperatures up to 1200 C; the presence of monomer FBO could not be detected either by absorption or by emission. From direct measurements of the equilibrium constant of the reaction B2O3(l) + BF3(g) in equilibrium with (FBO)3(g), the heat and entropy of reactions were determined as a function of temperature between 700 and 1000 K. The heat of formation of (FBO)3 at 298 K, is -567.8 kcal/mole, and the entropy value at this temperature is 81.0 cal/degree/mole. (Author)

AD-274 252 Div. 4
(TISTM/EJH) OTS price $1.60

Lund U. (Sweden).
THERMOCHEMISTRY OF SELECTED RADICAL RECOMBINATION REACTIONS.
Technical rept.,
by S. Sunner. 15 Jan 62, 10p. 20 refs.
(Contract AF 61(052)46)
(AFOSR-2237) Unclassified report

DESCRIPTORS: (Organic compounds, Alkyl radicals, *Sulfides, *Thiols, Photolysis, *Dissociation, Chemical bonds, Energy, Reaction kinetics, Chemical reactions, *Recombination reactions, Disproportionation, Thermochemistry, *Free radicals.) Photochemical reactions, Spectrographic analysis, Low temperature research.

The photolysis of primary or secondary alifatic disulfides in an organic matrix at 77 K quantitatively leads to the reaction R1R2CHSSCHR1R2 = R1R2CS + HSCHR1R2. Strong evidence is presented for the formation of stabilized thiyl radicals when a thiol is photolyzed. A few other compounds were studied strengthening the view that 2 fairly large radicals cannot simultaneously be formed and separately trapped in the system studied. Thus, one of the basic difficulties cannot be overcome in developing a method for the determination of radical recombination energies by warming up a solid solution of trapped, identical radicals, generated in situ. This statement should be valid in dealing with simple, not highly resonance-stabilized molecules. (Author)

AD-274 025 Div. 5, 8
(TISTP/JW) OTS price $5.60

New York U., Coll. of Engineering, N. Y.
ON MAKING INFORMATION FEEDBACK FAIL-SAFE,
by J. J. Metzner. 15 Dec 61, 45p. incl. illus. 9 refs. (Scientific rept. no. 8)
(Contract AF 19(604)6168, Proj. 4610)
(AFCRL 62-25) Unclassified report

DESCRIPTORS: (*Computers, *Feedback, Reliability, *Errors, Digital systems, Probability, Communication systems.) (*Computer logic, Metamathematics, Memory devices, Digital systems.)

Various possible decision policies are enumerated for both decision and information feedback subject to the restriction that communication be by binary sequences and that a binary decision be made for individual digits, as well as several other restrictions. It is then shown that, within the allowed class of systems, only the one decision feedback policy described previously and the two information feedback policy described herein can have the desired high-reliability fail-safe properties. The first information feedback system, which uses decision policies on the forward and feedback channels such that erasure-to-confirmation errors are always very rare on both channels, is shown to be nearly equivalent, but slightly inferior, to the decision feedback system. An exception to this statement holds when the feedback channel is extremely reliable in itself. The second information feedback system, which uses decision policies such that confirmation-to-erasure errors are always very rare on both channels, has the advantage that reliability depends on the number of information digits per code word, rather than the number of check digits as in the other systems. Thus, a saving in the number of forward channel check digits is available. The system has the disadvantage that the receiver must store tentatively a large number of words. (Author)

AD-274 054 Div. 5
(TISTE/CAM) OTS price $2.60

International Business Machines Corp., Rockville, Md.
IMPROVED PHASE MODULATOR-DEMODULATOR.
Quarterly progress rept. no. 2, 1 Sep-30 Nov 61,
by Margaret George. 30 Nov 61, 23p. incl. illus.
(Contract DA 36-039-sc-87248)
Unclassified report

DESCRIPTORS: (*Communication systems, *Data transmission systems, Digital systems, Phase modulation, Detectors, Electronic circuits, Electrical networks, Design, Tests.) (Telephone lines, Voice communication systems, Circuits.) (*Modulators, Amplitude modulation, Phase shifters, Circuits, Pulse generators, Rectifiers, Oscillators, Pulse amplifiers, Design, Tests.)

Effort was continued towards the design of a modulator-demodulator. The logic, circuit, and mechanical designs of the units are covered in detail. The problem of obtaining a good method of generating and detecting a syne bit resulted in a considerable amount of logic and circuit redesign. It is felt that this method, which uses a phase shift in the center of a bit, is the best and simplest method to use in a unit of this small physical size. Additional design work was done on some of the circuits. The basic circuits to be used are still in doubt. (Author)

6. DETECTION

AD-274 241 Div. 5, 18
(TISTB/AW) OTS price $3.60

Laboratories for Research and Development, Franklin Inst., Philadelphia, Pa.
EXPERIMENT COMMAD. A PILOT STUDY ON THE RELATION OF COMMUNICATION MEDIA TO STAFF DECISION MAKING. Interim rept. no. 2 on People, Organizations, and Communications. An Operations Research Study of Army Communications,
by Arnold E. Horowitz, Stephen D. Benson, and Edward P. Buckley. Apr 61, 33p. incl. illus. tables (Rept. no. I-A2313-2)
(Contract DA 36-039-sc-78332)
Unclassified report

DESCRIPTORS: (*Military communications, *Operations research, Military organizations, Effectiveness.) (*Communication systems, Military intelligence, Simulation, Telephone communication systems.)

This report deals with a pilot experiment to test the utility of simulated situations for the study of the effects of communications media on the effectiveness of staff functioning. Simulated situations in military environments were effectively employed for studying communications systems. No significant differences on the criterion measure were found between media. A program is outlined which is designed to provide definitive answers to the question of the effects of communications media upon the effectiveness of staff functioning. (Author)

AD-274 260 Div. 5, 30
(TISTP/JW) OTS price $3.60

Naval Ordnance Lab., White Oak, Md.
THE PERCEPTRON AS AN ADAPTIVE CLASSIFICATION DEVICE,
by C. Nicholas Pryor, Jr. 26 Oct 61, 18p. illus. 11 refs. (Rept. no NOLTR 61-114)
Unclassified report

DESCRIPTORS: (*Data processing systems, Learning, *Classification, Computers.) (Sonar equipment, Target position indicators, *Computer logic, Errors, Test methods.)

Under certain conditions an adaptive data system can be built to determine a solution to the data classification problem, based on samples of input data along with their proper classification. The perceptron and the simpler half-perceptron are machines of this sort, and their principles of operation and simulation on an IBM 704 computer are discussed. Sample problems exhibit the capabilities and limitations of each. The possible role of these machines in sonar target classification is also discussed. (Author)

AD-274 362 Div. 5, 12
(TISTE/NTM) OTS price $1.60

ITT Kellogg, Chicago, Ill.
FIXED GROUND COMMUNICATION SYSTEMS. WEAPONS SYSTEM 107A-1.
Program progress rept. no. 59 for Mar 62. Mar 62, 14p.
(Contracts AF 04(647)312, AF 04(647)461 and others)
Unclassified report

DESCRIPTORS: (*Guided missiles, Surface to surface, *Communication systems, *Communication equipment, Installation in Military facilities, Quality control, Scheduling, Ground support equipment.)

AD-274 065 Div. 6, 12
(TISTW/DLW) OTS price $8.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
RADAR CROSS-SECTION OBSERVATIONS OF THE ECHO I COMMUNICATIONS SATELLITE AT 440 MC/S,
by D. P. Hynek. 19 Feb 62, 94p. incl. illus. tables (Rept. no. 30 G-2)
(Contract AF 19(604)7400)
(AFESD TDR 62-72) Unclassified report

DESCRIPTORS: (*Satellite vehicles, Balloons, Reflectors, *Radar echo areas, Radar reflections, L band, Ultra high frequency, Measurement.) (Spheres, Space environmental conditions, Analysis.) (Radio communication systems, Voice communication systems, Radio waves, Reflection.)

Radar cross-section measurements were conducted on Echo I (60 Iota 1), a passive communications satellite, from the first revolution on 12 August 1960 to revolution 5159 on 6 October 1961. Tracks on the early revolutions, up to about 92, generally displayed a fairly constant amplitude, indicating little deformation of the spherical shape of the balloon. Later recordings show amplitude patterns with various amounts and rates of fading. Fast scintillations, with a period of the order of 0.5 - 1 second, can be seen during certain runs as well as slow long-term fading during others. Beginning with about revolution 1944 (18 January 1961), a gradual deterioration in the shape of the balloon was indicated by frequent deep fades and a generally rough amplitude pattern. Amplitude records for 14 of the observed passes are included. A summary is also included for a voice communications experiment conducted between Millstone and the Prince Albert Radar Laboratory during revolution 12. (Author)

AD-274 098 Div. 6
(TISTW/RD) OTS price $4.60

California Inst. of Tech., Pasadena.
AN ANALYSIS OF ECHOES FROM A SOLID ELASTIC SPHERE IN WATER,
by Robert Hickling. Mar 62, 20p. illus. (Rept. no. 85-20)
(Contract Nonr-22028)
Unclassified report

DESCRIPTORS: (*Underwater sound, Reflection.) (*Echo ranging, *Sound ranging, *Sonar.) (Reflection from Underwater objects, Spheres, Elastic shells.) *Underwater sound transmission, Mathematical analysis of Reflection of Underwater sound signal from *Sonar targets.

It is well-known in sonar work that the pulse form of a direct echo from a target bears little relation to the form of the original signal. This is true even for regularly shaped bodies, such as a sphere. In this study, the case of a homogeneous elastic sphere in water is examined theoretically and it is shown, in comparison with experimental results, that the observed effects originate from vibrations induced in the sphere by the incident sound. Calculated results are presented for a variety of solid materials, and it seems that echo forms could possibly provide information about the size and constitution of a sonar target. (Author)

AD-274 156 Div. 6, 25
(TISTW/DLW) OTS price $4.60

Applied Physics Lab., Johns Hopkins U., Silver Spring, Md.
A PROPOSED ULTRASONIC ACQUISITION SYSTEM FOR PULSED RADAR,
by T. Calhoon, A. Finkel and others. Sep 61, 43p. incl. illus. (Rept. no. CM-1002)
(Contract NOrd-7386)
Unclassified report

DESCRIPTORS: (*Doppler radar, Radar pulses, Radar reflections, Range finding, Display systems, *Data processing systems, Radar equipment, Electronic circuits, Design.) (Radar signals, *Video signals, *Frequency analyzers, Sweep generators, Storage tubes, Modulators, Optical systems, Timing circuits, *Ultrasonics, Image converter tubes, Tests.) (Radar receivers, Radar range computers.)

A system is described which was designed and constructed to test techniques for a radar acquisition system capable of high speed data processing. A description of a system instrumented to measure range to 100 feet and doppler shift to 300 cps is given. The acquisition system channel is broken down into four major subdivisions: (1) the storage tube and its associated electronics; (2) a master timer used to time all the operations of the system; (3) the Ultrasonic Light Modulator (ULM) with its associated crystal driving amplifier and optical system; and (4) the image converter and image orthicon read-out system. (Author)

AD-274 168 Div. 6, 8
(TISTE/CDM) OTS price $1.25

National Aeronautics and Space Administration, Washington, D. C.
RECEIVING SYSTEM DESIGN FOR THE ARRAYING OF INDEPENDENTLY STEERABLE ANTENNAS FOR DEEP SPACE COMMUNICATIONS,
by James H. Schrader. Apr 62, 42p. incl. illus. 4 refs. (Technical note D-1025)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1025.

DESCRIPTORS: (Radar receivers, Radio receivers, *Telemetering antennas, Parabolic antennas, *Coupled antennas, Design, Costs.) (*Telemetering receivers, *Communication equipment, Ground support equipment for Space probes.) (Radio signals, Signal-to-noise ratio, Frequency modulation.)

The problem of arraying independently steerable antennas for use in deep space communications systems was studied. A basic design is given for a receiving system capable of utilizing all the signal power received on a number of antennas without requiring that the signals be phase coherent. The various considerations involved in the selection and location of antennas for use in such an array are discussed. For very large aperture systems, the array approach appeared to offer both economic and technical advantages over the single-reflector approach. (Author)

AD-274 202 Div. 6, 15
(TISTP/TL) OTS price $1.60

Brown U. Div. of Applied Mathematics, Providence, R. I.
AN APPROXIMATE METHOD IN SIGNAL DETECTION,
by Walter F. Freiberger. Jan 62, 10p. incl. illus. 3 refs. (Technical rept. no. 12)
(Contract DA 36-039-sc-78130)
Unclassified report

DESCRIPTORS: (*Radio signals, *Detection, Signal-to-noise ratio, Correlation techniques.) (*Statistical processes, Probability, Statistical analysis, Matrix algebra, Integral transforms, *Statistical tests.)

A theorem from the theory of Toeplitz norms is applied to the problem of estimating the best test statistic for the detection of Gaussian signals in Gaussian noise. (Author)

AD-274 282 Div. 6, 5, 8
(TISTW/DLW) OTS price $7.60

Bendix Systems Div., Bendix Corp., Ann Arbor, Mich.
SCADAR.
Final rept.,
by R. G. Peltzer. Dec 61, 1v. incl. illus.
(Rept. no. BSC-30697; BSR-628)
(Contract AF 30(602)1861)
(RADC TDR 62-45) Unclassified report

DESCRIPTORS: (*Antiaircraft defense systems, Aircraft, Flight paths, Detection by Scattering of Radio waves during Flight over *Radio communication systems, Tests.) (Radio signals, *Data processing systems.) (Radio transmission, Radio interference, Wave transmission, Amplitude modulation, Frequency modulation, Propagation.)

SCADAR efforts were concerned with the implementation of a new technique of data processing to yield even greater detection sensitivity. This technique was shown to have considerable promise when implemented by simulation in the laboratory. A working system was installed on the troposcatter DEW line training link in Illinois. Field tests were conducted during November 1961, using commercial airplane traffic as targets. By operating at night when the traffic density was low, and by choosing times when the transmitter was operating properly, satisfactory results were obtained which clearly demonstrated that, under better field-test conditions and in the presence of a typical enemy threat, the technique under evaluation would provide a detection capability superior to the methods previously employed. (Author)

7. ELECTRICAL EQUIPMENT

AD-273 953 Div. 7, 20
(TISTB/AW) OTS price $4.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
THERMOELECTRIC GENERATORS AND MATERIALS. RADIATION EFFECTS, RELIABILITY, LIFETIME, AND FAILURE. AN ANNOTATED BIBLIOGRAPHY,
comp. by E. Graziano. Jun 62, 40p. (Special bibliography no. SB-61-60; Rept. no. 3-88-61-1)
Unclassified report

DESCRIPTORS: (*Bibliography, *Thermoelectricity, Generators, Materials, Radiation effects, Reliability, *Failure (Mechanics), Aging.) (*Radioactive batteries, Nuclear power plants, Nuclear energy, Selenium, Tellurium, Reactor fuels, Tellurium compounds.)

This literature search was conducted as part of research on the problems of using thermoelectric generators in space, which would directly convert heat from nuclear sources, into electricity. The purpose was to bring to light any information regarding reliability, lifetime, and mean time of failure of thermoelectric generators and materials due to oxidation, cracking, galvanic action, short circuits, radiation effects, and sublimation. The results indicate that almost nothing exists in the technical literature concerning lifetime and reliability of thermoelectric generators: for this reason, the scope of the bibliography was broadened considerably to include selected references to other thermoelectric devices and material when any mention was made of factors that might cause failure or malfunction. (Author)

AD-273 971 Div. 7, 4
(TISTM/EJH) OTS price $2.50

General Electric Co., Lynn, Mass.
RESEARCH ON LOW TEMPERATURE FUEL CELL SYSTEMS.
Technical summary progress rept. no. 19, sec. 2, 1 Nov 59-30 Nov 61.
30 Nov 61, 105p. incl. illus. tables, 67 refs.
(Contract DA 44-009-eng-3771)
Unclassified report

DESCRIPTORS: (*Fuel cells, *Electrolytic cells, Fuels, Hydrocarbons, Electrodes, *Oxygen electrodes, Hydrogen electrodes, Ion exchange, Membranes, *Catalysts, Platinum, Chemical reactions, Oxidation-reduction reactions, Electrochemistry, Polarization, Thermodynamics.) Hydrogen, Oxygen, Low temperature research.

Polarization behavior of the oxygen electrode and of the H-O fuel cells using a variety of catalytic electrodes in acidic, alkaline and solid-ion-exchange membrane electrolytes was investigated. It was concluded that: (a) under the practical operating conditions of H-O fuel cells, an IR-free, steady state emf greater than approximately 0.93v is not likely to be achieved; (b) the IR-free polarization loss of approximately 0.3v appears to be associated with some specific property of the H-O fuel cells; (c) Pt black appears to be the best catalyst known to date for the oxygen electrode; and (d) various existing theories of the irreversibility of the oxygen electrode were reviewed and it is concluded that none of these can satisfactorily explain all the experimental observations concerning the open-circuit behavior of the oxygen electrode. A tentative interpretation based on the double layer capacitance effects is suggested for the various effects associated with the irreversibility of the H-O fuel cells at or near the open-circuit conditions. (Author)

AD-273 974 Div. 7, 25
(TISTE/CDM) OTS price $1.75

Giannini Controls Corp., Pasadena, Calif.
A NEW FORM OF SOLID STATE SOLAR GENERATOR,
by E. D. Fabricius. Jan 62, 62p. incl. illus. tables, 6 refs.
(Contract AF 33(616)7637, Proj. 3145)
(ASD TR 61-564) Unclassified report

DESCRIPTORS: (Solid state physics, *Solar cells, *Generators, Design.) (*Photoelectric cells, Metals and *Semiconductors, Cadmium compounds, Sulfides, *Photoconductivity, *Electric power production.)

An investigation was made of variable voltage photovoltaic converters for a new form of solid state solar generator. Valuable information related to the origin of the photoconducting electrons in the photovoltaic effect in CdS was obtained. This information is pertinent to the design and construction of metal-semiconductor solar cells, in that both the photovoltage and the efficiency of metal-semiconductor cells is dependent upon whether electrons are injected from the metal or excited across the forbidden gap of the semiconductor. The effects of geometry, film thickness of rectifying electrode, and resistivity of CdS upon the photovoltage obtainable were also studied. The origin of the electrons producing the photocurrent was determined and a geometry for optimizing the photocurrent is given. Cells designed by evaporating contacts connected in series are shown to give an additive photovoltage. Suggestions for improving the efficiency are given in the light of experimental evidence. While batteries producing 9v were not successfully constructed due to experimental difficulties, the evidence obtained verifies the feasibility of the basic design. (Author)

AD-274 051 Div. 7, 8
(TISTE/CDM) OTS price $3.60

Advanced Electronics Center, General Electric Co., Ithaca, N. Y.
THE FREQUENCY MODULATED SELF-STABILIZING INVERTER AND ITS APPLICATION TO A REGULATED AC TO DC POWER SUPPLY.
Quarterly progress rept. no. 1, 15 July-31 Oct 61, on Switch Modulation Techniques, by Francisc C. Schwarz. 31 Oct 61, 34p. incl. illus. 7 refs.
(Contract DA 36-039-sc-87353)
Unclassified report

DESCRIPTORS: (Frequency modulation, *Inverter circuits, Design, Rectifiers for *Power supplies, Direct current.) (Power, *Modulators, *Switching circuits, Electronic switches.) (Silicones, Semiconductors, Resistors, Nonlinear systems, Solid state physics, Electronic circuits.)

Potential improvements of power supplies were studied in the light of advancements of circuit concepts and technology of components. Two concepts were studied: the FM-SS inverter; and the tap switch modulation approach, which was abandoned. Progress on the FM-SS inverter was demonstrated by operation of a breadboard near rated power in conjunction with a verbal presentation. This power modulator is self-stabilizing, self-protecting, operates as an active filter section with respect to the source ripple, has automatic controlled rectifier turn-off, under elimination of commutation currents, and uses no energy-destructive (damping) networks. These properties indicate a lightweight, reliable power supply with relatively high efficiency. Attenuation of the source ripple by a factor four was attained experimentally by active filtering of the FM-SS inverter, and there are efforts underway for further improvement. A reduction of size and weight of at least two-thirds, compared to a conventional power supply with equal performance and efficiency, is expected. (Author)

AD-274 070 Div. 7, 25
(TISTB/LH) OTS price $3.50

Naval Research Lab., Washington, D. C.
DIRECT ENERGY CONVERSION LITERATURE ABSTRACTS.
Apr 62, 225p.
Unclassified report

DESCRIPTORS: (*Bibliography, Energy.) (*Thermoelectricity, Thermionic emission, Photoemission, Photoelectric cells, *Magnetohydrodynamics, Electrochemistry, Fuel cells, Primary batteries, Storage batteries, Nuclear energy, *Solar energy, *Power supplies, Solar cells.)

AD-274 164 Div. 7
(TISTA/SEB) OTS price $5.60

Monsanto Research Corp., Dayton, Ohio.
HIGH TEMPERATURE THERMOELECTRIC GENERATOR.
Quarterly progress rept. no. 2, 1 Jan-30 Mar 62,
by C. M. Henderson and R. G. Ault. 30 Mar 62,
43p. incl. illus. tables.
(Contract AF 33(657)7387, Proj. 3145)
Unclassified report

DESCRIPTORS: (*Thermoelectricity, *Generators, Electric power production, Power supplies, Design.) (Thermocouples of Carbon, Molybdenum, Tungsten, Manufacturing methods, Tests.) Resistance.

The development continued of a 5-watt laboratory thermoelectric generator capable of operating at a hot junction temperature of 1200 C in a vacuum of .00001 mm Hg. Fourteen candidate junction materials were screened for use with MCC 50 in the production of thermocouple modules. Of these, C, Mo and W are being considered for the end product generator. Three methods for fabricating thermocouple modules with MCC 50 were studied and a hot-press/braze method selected for use in the making of modules for the end product. In sublimation rate loss tests conducted for 500 hr at 1200 C at .00001 to .000001 mm Hg, MCC 50 thermoelectric material lost only 0.53% weight. The rate of sublimation loss appears to decrease with time. Measurements of electrical properties of modules, before and after 100 hour tests at 1200 C, indicate the end product generator can be operated well beyond 1000 hrs, the design goal. Merit factors (Z) of MCC 50, based on extrapolations of thermal conductivity measurements from 1000 C, range from .0006 to .0011 per degree between 1200 and 1500 C. A 4-module prototype generator unit was constructed and is being tested at 1200 C in a vacuum. (Author)

AD-274 197 Div. 7, 17, 14, 12
(TISTM/BRW) OTS price $7.60

Allison Div., General Motors Corp., Indianapolis, Ind.
DESIGN AND DEVELOPMENT OF A LIQUID METAL CELL.
Quarterly technical progress rept. no. 1,
1 Jan-31 Mar 62,
by B. Agruss and H. R. Karas. 15 Apr 62, 65p.
incl. illus. tables (Rept. no. EDR 2678)
(Contract AF 33(657)7847, Proj. 3145)
Unclassified report

DESCRIPTORS: (*Guided missile batteries, Design, Spaceships, Satellite vehicles, *Power supplies.) (*Liquid metals, Physical properties, Chemical properties, Electrical properties, Potassium, Mercury, Potassium alloys, Mercury alloys, Electrodes.) (Salts, Potassium compounds, Hydroxides, Bromides, Iodides, Electrolytes.) (*Electrolytic cells, *Electrochemistry, Theory, Alkaline cells.) (Battery compartments, Materials, Steel, Stainless steel, Tungsten, Molybdenum, Chromium, Aluminum compounds, Magnesium compounds, Physical properties, Thermal expansion.) Electric insulation, Ceramic materials, Oxides, Battery separators.

Electrochemical, physical, and chemical characteristics of K, Hg, and K-Hg amalgams lend themselves to the successful operation of a liquid metal cell for space power. Construction of single liquid metal cells and a 3-cell unit is complete and testing is in progress. Preliminary design work to show that the cells can be combined into a system which will function as a battery is nearly complete. Photographs and detailed drawings of the units used for the cell, instrumentation, feed system, etc, are shown. (Author)

AD-274 276 Div. 7
(TISTE/CAM) OTS price $1.60

Union Carbide Consumer Products Co., Parma, Ohio.
FEASIBILITY STUDY ON HIGH PERFORMANCE, SHORT DURATION POWER BATTERIES.
Quarterly technical progress rept. no. 15,
15 Dec 61-15 Mar 62,
by M. L. Kronenberg, S. Senderoff, and
E. M. Klopp. 15 Mar 62, 16p. incl. illus.
(Contract NOrd-18240)
Unclassified report

DESCRIPTORS: (Feasibility studies, *Primary batteries, *Power supplies.) (Cathodes (Electrolytic cell), Potassium compounds, Lithium compounds, Chlorides, Sulfates, Eutectics.) (Electrolytic cells, Antimony compounds, Copper, Oxides, Borates, Silicates, Phosphates, Iron compounds.) Packaging, Design, Torpedo batteries, Guided missile batteries.

Work continued on the development of a very high power density battery system. Some 72-hour diffusion runs involving silver were made. The data were used to calculate D and delta H for the diffusion process. The work on measuring the diffusion coefficient of phosphate ion was started but it was found that the data obtained were very erratic due to the low solubility of the ion. A number of cells involving sulfates or phosphates as both depolarizer and electrolyte were made and tested. The best of the phosphate cells involved $LiPO_3$-$Cu(PO_3)_2$ as the depolarizer and gave 265 WH/lb of active materials. Cells involving K_2SO_4-Li_2SO_4 gave 110 WH/lb of active materials. (Author)

Division 7 - ELECTRICAL EQUIPMENT

AD-274 280 Div. 7
(TISTE/NTM) OTS price $4.60

Westinghouse Electric Corp., Cheswick, Pa.
NAP-100 THERMOELECTRIC GENERATOR REPORT,
by G. Spira and T. M. Corry. Nov 61, 38p. incl. illus. tables, 4 refs.
(Contract AF 30(602)1875, Proj. 6185)
(AFSWC TDR 61-99) Unclassified report

DESCRIPTORS: (*Generators, Auxiliary power plants, *Thermoelectricity, *Isotopes, Heat transfer, Heat exchangers, Cooling, Manufacturing methods.) (Power plants, Power supplies, *Electric power production, *Nuclear power plants, Thermal conductivity, Thermocouples, Impedance matching, Tests.)

The development and performance are presented of a 100-w isotopic fuel, thermoelectric generator designated NAP-100 (Nuclear Auxiliary Power). The generator unit was treated as an integrated system to minimize size and weight without undue sacrifice in efficiency. The 3 basic elements of the generator are: (1) the cold side convective heat exchanger, (2) the thermoelectric couple assembly, and (3) the heat source (an electrical heater which simulated the thermal performance of the nuclear heat source was designed and delivered with the generator). (Author)

AD-274 306 Div. 7, 30, 8
(TISTP/TL) OTS price $2.60

Electronics Research Lab., U. of Calif., Berkeley.
A UNIQUE SYNTHESIS METHOD OF TRANSFORMERLESS ACTIVE RC NETWORKS,
by S. K. Mitra. 12 Oct 61, 22p. incl. illus. 9 refs. (Series no. 60, Issue no. 411)
(NSF Grant no. G-12142)
Unclassified report

DESCRIPTORS: (*Electrical networks, *Synthesis, Reflection, Polynomials.) (Resistors, Capacitors.)

A unique decomposition of active RC driving-point impedance functions is presented, which was obtained by considering the driving-point synthesis problem in terms of the reflection coefficient. Application of the decomposition has been shown to guarantee the realization of the driving-point impedance in Kinariwala's cascade configurations and Sandberg's special configurations, each containing one negative impedance converter. The method imposes no restriction on the impedance function, except that it has only to be a real rational function. The decomposition technique can be easily programmed on a digital computer. (Author)

8. ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-273 958 Div. 8
(TISTE/CDM) OTS price $4.60

Naval Avionics Facility, Indianapolis, Ind.
PRINTED WIRING BOARDS, DIELECTRIC STRENGTH OF,
by Richard E. Martz and William C. Underwood.
16 Oct 61, 45p. incl. illus. tables, refs.
(Rept. no. TR-92)
(Proj. X999-0028)
Unclassified report

DESCRIPTORS: (*Printed circuits, *Electrical corona, Electric arcs, Electric discharges, Failure (Mechanics), Tests, Dielectric properties.) (Electronic circuits, *Circuits, *Conductors, Test equipment, High altitude, High temperature research, Humidity, Tests.) (Airborne, Electronic equipment, Naval equipment, Aviation safety, Safety.)

Corona and breakdown voltage information is presented for use in the design of printed wiring boards for high altitude applications. The complete mass of raw data is published in addition to the recommended conductor spacings, because of requests by design engineers who prefer to review the raw data and set their own safety factors for each particular design application. Recommended spacings between the conductors on printed wiring boards were established. The corona discharge and dielectric breakdown voltages were measured for each of ten different spacings: .010, .015, .022, .025, .032, .062, .093, .125, .187, and .250 inches. (Author)

AD-273 959 Div. 8, 6
(TISTE/NTM) OTS price $2.60

HRB-Singer, Inc., State College, Pa.
DATA ANALYSIS AND LONG RANGE INTERCEPT TECHNIQUES.
Final rept. 21 Mar-21 Dec 61 on Research and Development on Phase Shift Amplifiers in the 50-1100 Mc Band,
by E. Wintermute and V. Rathfelder. 21 Dec 61, 28p. incl. illus. table, refs. (Rept. no. 290-F)
(Contract DA 36-039-sc-87272)
Unclassified report

DESCRIPTORS: (*Phase shifters, *Parametric amplifiers, *Microwave amplifiers, Very high frequency, Ultra high frequency, P band, L band, Design.) (Amplifiers, Model tests, Transistors, Semiconductors, Crystals, Klystrons, Modulation, Measurement.) (*Radio interception, *Radar interception, Noise (Radio), Broadband.)

Laboratory investigations have indicated that the phase shift amplifier has the capability of providing broadband low noise gain at frequencies as high as 1100 mc. The basic limitations of the phase shift amplifier are its intermodulation and cross-modulation characteristics which require it to be employed only in environments where there are no signals, within its band, having a power level greater than minus 40 dbm. For those applications where noise figure is not of primary concern, its power requirements and large physical size are also limitations when compared to transistor amplifiers. At higher frequencies, where transistor amplifiers are not available, the latter limitations become less significant. (Author)

AD-273 968 Div. 8, 7, 15
(TISTP/JW) OTS price $3.60

Boeing Scientific Research Labs., Seattle, Wash.
COHERENT STRUCTURES OF NON-IDENTICAL COMPONENTS,
by J. D. Esary and F. Proschan. Feb 62, 34p. incl. illus. 3 refs. (Mathematical note no. 251; Document no. D1-82-0154)
Unclassified report

Also available from the author.

DESCRIPTORS: (*Electrical networks, Synthesis, Reliability.) (Mathematical analysis, *Analysis of variance, Binomials.)

A basic theorem on the covariance of increasing functions of random variables is explored which permits a discussion of the case of coherent structures whose components are independent, but of differing reliabilities. This provides convenient bounds on the reliability of structures, a generalization of some statistical properties (Technometrics, Vol 3, No 1:55-77, 1961) for coherent structures, and finally a generalization of a differential inequality (Jnl of the Franklin Institute, Vol 262:191-208, 281-297, 1956) which relates structural and component reliabilities. One of the consequences of the present approach is a very simple and direct demonstration of the S-shapedness results presented. (Author)

AD-273 984 Div. 8, 25
(TISTE/CDM) OTS price $3.00

Sperry Microwave Electronics Co., Clearwater, Fla.
THEORETICAL AND EXPERIMENTAL INVESTIGATION TO DETERMINE THE MICROWAVE CHARACTERISTICS AND APPLICATIONS OF HEXAGONAL MAGNETIC OXIDES TO MICROWAVE CIRCUITRY.
Technical rept.,
by G. P. Rodrigue. 10 Dec 61, 156p. incl. illus. tables, 106 refs. (Rept. no. SJ220-00012A-8)
(Contract AF 30(602)2330, Proj. 5578)
(RADC TR 62-54) Unclassified report

DESCRIPTORS: (*Magnetic materials, Barium compounds, Cobalt compounds, Iron compounds, Nickel compounds, Oxides, Crystals for Microwave frequency, *Phase shifters, *Microwave networks, Electronic circuits, Test methods, X-ray diffraction analysis, Tests, Measurement, Synthesis.) (Superhigh frequency, Extremely high frequency, K band, Resonance, Absorption, Microwave equipment.) (*Ferrites, Ferromagnetic materials, *Metallic crystals.) *Bibliography, Theory.

An investigation was made of the properties of hexagonal magnetic oxides and of their application to specific microwave devices. A procedure was developed for the preparation of good, high density, ceramic samples of 9 different Me2Z and Me2Y compounds and a series of (Ni(1-x)Co(x))2W materials. Studies of the degree of orientation of the materials were carried out using x-ray diffraction techniques. The samples prepared were subjected to both static and microwave evaluation. The measured linewidth was found to be independent of cobalt content over this range of substitutions. A strong dependence of linewidth on degree of orientation was noted. Appropriate members of the nickel-cobalt W series were evaluated in K- and V-band resonance isolators. (Author)

Division 8 - ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-274 006 Div. 8
(TISTE/CAM) OTS price $9.60

Hughes Aircraft Co., Newport Beach, Calif.
HIGH FREQUENCY TRANSISTOR STUDY.
Interim engineering rept. no. 3 (Final), 1 Oct 61-28 Feb 62,
by Hans G. Dill and R. Zuleeg. 16 Mar 62, 1v.
incl. illus. 18 refs.
(Contract NObsr-85296)
Unclassified report

DESCRIPTORS: (*Transistors, *Transistor amplifiers, Germanium, High frequency, Design, Processing, Tests.) (*Microwave networks, *Packaged circuits, *Microwave oscillators, *Microwave amplifiers, Mixer tubes.) (Microwave equipment, Test equipment, Signal-to-noise ratio, Measurement, Mathematical analysis, Electrostatic capacitances, Impedance, Electrical properties, Mechanical properties.) (Alloys, Gold, Aluminum.)

A 1 gc, coaxially packaged, germanium PNP epitaxial mesa transistor was developed and its electrical properties were evaluated in the frequency range from 200 to 1500 mc. Transit-time mode oscillation was verified around 1.5 gc in combination with a parametrically pumped down converter at a signal frequency of 750 mc. A coaxial mixer was constructed which will accommodate these coaxially packaged transistors. A stable conversion power gain of approximately 45 db at 750 mc signal and 2 mc intermediate frequency was obtained. The approximate noise figure of 15 db was calculated from a measured sensitivity of 2 microvolt and a bandwidth of 500 kc. The nonlinear elements in drift transistors, which can be used for frequency conversion, were treated theoretically and verified experimentally. A variable, nonlinear reactance available at the emitter-to-base terminal of a drift transistor was employed for reactive mixing in a parametrically excited mode. (Author)

AD-274 008 Div. 8, 25
(TISTP/FR) OTS price $2.60

National Electrotechnical Inst. (Italy).
ON THE RELATION BETWEEN FROZEN POLARIZATION AND ELECTROLUMINESCENCE OF ZnS CELLS.
Summary rept. Part B on Experiments on Electroluminescence,
by G. Bonfiglioli, P. Brovetto and R. Malvano.
Jan 62, 10p. illus.
(Contract AF 61(052)328)
(AFOSR-2321, pt. B)
Unclassified report

DESCRIPTORS: (Electrostatic fields, *Luminescence, *Polarization, Zinc compounds, Sulfides.)

The kinetics of the decay of the Frozen Polarization (FP) shown by an Electroluminescent Cell (ELC) after excitation which a suitable waveform of electrial potential has been studied as a function of temperature between +7 C and +42.5 C. The order of the kinetics was evaluated as well as the thermal activation energy, which turned out to be around 2.5 ev. This figure corresponds closely to the ionization energy of Cu(+) impurities in ZnS(Cu) phosphor. The kinetics of the decay of the amount of light which an ELC gives out under excitation by a single linear voltage transient retarded on variable amounts with respect to a previous excitation were investigated. The latter consisted of a train of linear transients long enough to saturate the cell. The phenomenon has been followed from -44.5 C to +47.5 C, and again an activation energy has been found of roughly 1.5 ev. The connection between these two experiments and its possible implications are briefly discussed to cast some light on the mechanism of barrier injection of carriers in EL phosphors. (Author)

AD-274 030 Div. 8
(TISTM/BRW) OTS price $5.60

Space Technology Labs., Inc., Los Angeles, Calif.
REPRODUCIBILITY STUDIES ON CIRCUITS EMPLOYING THIN FILM SUPERCONDUCTORS FORMED BY VACUUM DEPOSITION,
by A. J. Learn and R. S. Spriggs. 10 Oct 61, 46p. incl. illus. 17 refs. (Rept. no. 8971-0003-RU-000)
(Contract Nonr-254200)
Unclassified report

DESCRIPTORS: (*Superconductors, Thin films, Production, Manufacturing methods by *Vapor plating, *Metal coatings of Metal films, Lead, Tin and *Plastic coatings, Polymers, Silicones, Electric insulation.) Low temperature research, Low pressure research, Electronic equipment, Circuits.

Thin-film cryotrons with Sn gate thickness reproducible to within 5% and Pb control films having less than one micron penumbra were fabricated. For such films, formed under carefully controlled evaporation conditions, Sn critical temperatures are reproducible to within 0.005 K and critical currents for the cryotron to about ±5% with comparable tolerances for the low temperature resistivity of the Sn. A detailed discussion of apparatus designed for control of evaporation parameters and film geometry is given. Study of film formation through monitoring of film conductance yielded information regarding the nature of the scattering of conduction electrons at the walls of the film. Films formed at or annealed at room temperature show purely spectral scattering. In addition, such studies reveal a minimum critical thickness for onset of electrical conduction of about 90 Angstroms for both Sn and Pb. This value is obtained for very large deposition rates independent of substrate temperature. (Author)

AD-274 031 Div. 8
(TISTE/NTM) OTS price $10.50

Union Thermoelectric Div., Comptometer Corp., Niles, Ill.
THE DESIGN OF FUNDAMENTAL MODE THICKNESS-SHEAR QUARTZ RESONATORS (MILITARY TYPES: CR-18/U AND CR-19/U),
by Len A. Tyler. Aug 61, 127p. incl. illus. tables.
(Contract DA 36-039-sc-71061)
Unclassified report

DESCRIPTORS: (*Quartz resonators, *Crystal oscillators, *Quartz crystals, Crystal holders, High frequency, Medium frequency, Design, Manufacturing methods, Military requirements.) Communication equipment.

Research concerns the design of fundamental mode quartz resonators in the CR-18/U frequency range. Basic problems associated with AT type resonator design are discussed, along with the relative advantages of various plate configurations. Investigations were limited to circular plates and to spherical beveling or contouring, where necessary. Three plate designs were chosen for extensive study: plane parallel, plano-convex, and bi-convex. The effects of the various plate

parameters on the performance of resonators of these designs are discussed. Tables of numerical results obtained with the experimental units that were fabricated are also included. Satisfactory results were obtained with plane-parallel plates from 7 to 20 mc., with plano-convex plates from 1.4 to 9 mc., and with bi-convex plates from 850 kc. to 4.0 mc. Specific design data is given for plano-convex plates from 1.4 to 10 mc., and for bi-convex plates from 800 kc. to 1.5 mc. (Author)

AD-274 061 Div. 8, 20
(TISTP/WH) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
THE ROLE OF THE EMISSION CHANNEL IN AN ION SOURCE,
by S. N. Popov. 22 Mar 62, 12p. incl. illus. 13 refs. (Trans. no. FTD-TT-62-435 of Zhurnal Tekhnicheskoy Fiziki 31, no. 12p. 1431-1438, 1961)
Unclassified report

DESCRIPTORS: (*Ionic current, Anodes, Thermionic emission, Secondary emission, Space charges, *Plasma physics, Gas discharges.) USSR.

Results are given of an investigation of the ion current as a function of the selection potential and the geometry of the emission channel. (Author)

AD-274 063 Div. 8
(TISTE/CDM) OTS price $28.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
ELECTRONIC DEVICES (SECOND EDITION) (Elektronnyye Pribory),
by M. S. Kaufman and G. M. Yankin. 26 Jan 62, 653p. incl. illus. tables (Trans. no. FTD-TT-61-102 of Elektronnyye Pribory Gosudarstvennoye Energeticheskoye Izdatel'stvo, Moskva, Leningrad, 544p., 1960)
Unclassified report

DESCRIPTORS: (*Electronics, *Textbooks, USSR.) (Electron tubes, Amplifiers, Radio receivers, Radio transmitters.) (Electron tubes, Superhigh frequency.) Electrons, Theory, *Electron optics, Thermionic emission, Photoemission, *Cathodes, Oxide cathodes, *Diodes, *Triodes, Tetrodes, Pentodes, *Electron tubes, Frequency converters, *Semiconductors, *Cathode ray tubes, Klystrons, Magnetrons, Traveling wave tubes, *Phototubes, Photomultipliers, X rays, Electron tubes.

Contents:
Fundamentals of electron theory
The elements of electron optics
Electron emission
Hot cathodes for electronic devices
The two-element tube - the diode
The three-electrode tube - the triode
Triode applications
Screen-grid tubes - tetrodes and pentodes
Tubes for frequency conversion
Receiving-amplifier tubes
Transmitting tubes
Electron tubes for superhigh frequencies
Klystrons, magnetrons, and traveling-wave and backward-wave tubes
Photoelectric devices
Cathode-ray and electrooptical devices
X-ray tubes
Semiconductor devices

AD-274 071 Div. 8, 6
(TISTP/WH) OTS price $7.60

Electronic Systems Lab., Mass. Inst. of Tech., Cambridge.
A RADAR THEORY APPLICABLE TO DENSE SCATTERER DISTRIBUTIONS,
by Arthur Krinitz. Jan 62, 64p. incl. illus. 11 refs. (Rept. no. ESL-R-131)
(Contracts AF 33(616)5489 and AF 33(657)7644)
Unclassified report

DESCRIPTORS: (*Mapping, *Radar.) (Radar signals, *Scattering, Radar targets.) Theses, Video integration.

Radar is considered as a means of producing a map in two coordinates (x and y) of a dense distribution of scatterers. It is assumed that a complex unit-scatterer return $h(t;x,y)$ and a complex scatterer-density function $\psi(x,y)$ can be defined such that: (a) $h(t;x,y)$ depends only on the radar; (b) $\psi(x,y)$ depends only on the scatterer distribution; (c) the complex video representation of the echo signal is $s(t) = \int_{-\infty}^{\infty} \psi(x,y)\, h(t;x,y)\, dxdy$; and (d) an x-y display of $\psi(x,y)$ approximates, in some practically useful way, a map of the distribution of scattering objects in the x-y plane. The above conditions are satisfied if x and y are taken to be time delay and Doppler frequency. Determination of $\psi(x,y)$ is assumed to be the objective of the radar. (Author)

AD-274 079 Div. 8
(TISTE/CAM) OTS price $4.60

Sperry Gyroscope Co., Great Neck, N. Y.
TRAVELING-WAVE TUBE MIXER PROGRAM.
Interim engineering rept. no. 3, 1 Nov 61-31 Jan 62,
by L. Magill, I. Itzkan, and A. S. Ferello. Feb 62, 27p. incl. illus. tables, 9 refs. (Rept. no. NA-8210-8283-3)
(Contract AF 33(616)8074)
Unclassified report

DESCRIPTORS: (*Traveling wave tubes, *Mixer tubes, *Microwave amplifiers, Helixes, Signal-to-noise ratio, Noise (Radio), Design, Tests.) (*Parametric amplifiers, Electron guns, Cathodes (Electron tubes), Anodes (Electron tubes), Electrodes, Cyclotrons, Space charges, Electron beams, Magnets, Tests.) (Waveguide couplers, Coupling circuits, X band, L band, Microwave oscillators.)

An evaluation is presented of the possibilities of using the cyclotron wave device as a mixer. Progress in the construction of the two-helix traveling-wave tube mixer is discussed in detail. The low-noise electron gun to be used with the experimental traveling-wave tube mixer is also discussed. The external coupling helix design is reevaluated to insure optimum coupling at all frequencies. A preliminary investigation of the full-frequency mixing device was begun. (Author)

Division 8 - ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-274 101 Div. 8, 25, 30
(TISTE/CRJ) OTS price $6.60

Electronics Research Lab., U. of Calif., Berkeley.
(No title).
Consolidated quarterly progress rept. no. 4 for period ending 15 Feb 62.
15 Feb 62, 58p. incl. illus.
(Contract AF 49(638)1043, AF 19(604)2270 and others)
Unclassified report

DESCRIPTORS: *Electronics, *Electronic circuits, *Solid state physics, Semiconductors, Parametric amplifiers, Electrical networks, Pulse amplifiers, Transistors, Oscillators, Harmonic oscillators, Amplifiers, Feedback amplifiers, Transmission lines, *Computers, *Computer logic, Digital computers, Programming, Theory, Machine translation, Special functions, Microwave amplifiers, *Microwave equipment, *Plasma physics, Waveguides, Microwaves, Propagation, Magnetrons, Cyclotrons, Noise (Radio), Slot antennas, Antennas, *Electromagnetic waves, Crystals, Selenium, Light, Pulse modulation, Coding, Lasers, Nuclear magnetic resonance, Thin films, Garnet, Control systems, *Linear systems, *Nonlinear systems, Sequences, Delay lines, Information theory, Information retrieval, Television equipment, Circuit breakers, Inverter circuits.

A review is presented of the research projects conducted within the Electronics Research Laboratory, University of California, Berkeley, and of the progress made during the three month period ending February 15, 1962. (Author)

AD-274 110 Div. 8
(TISTE/CAM) OTS price $4.60

Electron Physics Lab., U. of Michigan, Ann Arbor.
THEORETICAL AND EXPERIMENTAL INVESTIGATION OF LARGE-SIGNAL TRAVELING-WAVE TUBES.
Quarterly progress rept. no. 6, 1 Oct 61-1 Jan 62,
by C. A. Brackett, S. K. Cho and others. Jan 62, 36p. incl. illus. 4 refs. (Rept. no. 03736 11-P)
(Contract AF 30(602)2303, Proj. 5573)
(RADC TDR 62-75) Unclassified report

DESCRIPTORS: (*Traveling wave tubes, *Klystrons, *Microwave amplifiers, Ultra high frequency, Helixes, Coupling circuits, S band, Standing wave ratios, Theory.) (Amplifiers, Electron tubes, *Electron guns, Cathodes (Electron tubes), Space charges, Numerical methods and procedures, Mathematical analysis, Theory.) (Magnetrons, Electron beams, Plasma physics, Electric fields, Magnetic fields.)

Detailed experimental data on an S-band high-power traveling-wave amplifier with a variable-pitch helix is presented with particular emphasis on the efficiency enhancement achieved across the frequency band. Efficiency improvement factors of from 1.4 to 2 to 1 are demonstrated. The gain is also enhanced over the entire frequency band of operation. Experimental data on a new elliptic cavity coupler for use with a helical circuit is shown. Low VSWR and insertion loss over a broad frequency band are indicated. The design of a magnetron injection gun for use with a high-power amplifier is outlined. Additional details on the noise transport analyses and beam-plasma interaction theory are given. (Author)

AD-274 114 Div. 8
(TISTE/NTM) OTS price $8.60

Motorola, Inc., Phoenix, Ariz.
A LOW-NOISE, X-BAND PARAMETRIC AMPLIFIER.
Final rept., 12 May 58-30 Nov 61.
5 Jan 62, 86p. incl. illus. tables, 11 refs.
(Rept. no. WF 2369)
(Contract AF 19(604)4088, Proj. 4610)
(AFCRL 62-37) Unclassified report

DESCRIPTORS: (*Parametric amplifiers, X band, K band, P band, L band, S band, Ultra high frequency, Superhigh frequency, Very high frequency, Airborne.) (*Microwave amplifiers, Broadband, Semiconductors, Diodes, Silicon, Arsenides, Gallium compounds.) *Amplifiers, Thin films, Cavity resonators, Electric fields, Crystals, Negative resistance circuits, Microwave oscillators, Signal-to-noise ratio.

The development of parametric amplifiers and related devices from VHF to X-band is described. The basic theory of parametric amplifiers is given for the negative resistance amplifier, upper and lower sideband converters, and the traveling-wave parametric amplifier. The diode development effort and the techniques employed to evaluate varactor diodes are described. The development of a VHF parametric amplifier and an S-band amplifier is described. Two X-band amplifiers are described, one operating in a degenerate mode and the other in a nondegenerate mode. A design of a broadband X-band amplifier is presented which theoretically yields 600 mc bandwidth. Diodes' requirements for achieving Ku, K and V-band parametric amplifiers are given. A stabilizing technique for parametric amplifiers is presented that improves parametric amplifier stability 6 to 1 for pump-power changes, and 8 to 1 for antenna-impedance changes. A brief discussion of cooling parametric amplifiers is given as well as anticipated results. The description of a corporate research study on tunnel-diode amplifiers is given. An amplifier for 450 mc was achieved with a 5 db noise figure, 15 mc bandwidth, and 15 db gain. (Author)

AD-274 115 Div. 8
(TISTE/CRJ) OTS price $2.60

New York U. Coll. of Engineering, N. Y.
STUDY OF SHORT TERM STABILITY OF CRYSTAL OSCILLATORS.
Quarterly rept. no. 2, 1 Oct-31 Dec 61,
by J. Rarity, L. Saporta, and G. Weiss.
31 Dec 61, 23p. incl. illus. 5 refs. (Rept. no. 6)
(Contract DA 36-039-sc-87450, Proj. 3A-99-15-021-02-02)
Unclassified report

DESCRIPTORS: (*Crystal oscillators, Phase modulation, Frequency modulation, *Noise (Radio).) (Oscillators, Radiofrequency filters, Stability, Frequency analyzers, Noise analyzers.) (Phase studies, Correlation techniques.)

Two definitions of frequency stability are discussed. One is basically the variance of the frequency as determined in an observation time. The second definition involves the variance of sample pairs of the first, the samples being separated by some time T. These definitions are shown to be simply related to each other. Since each is derivable from the spectrum of the noise, it is proposed that a convenient way of describing frequency stability is to specify the spectrum of the oscillator. From the spectrum either of the above, as well as other defini-

tions of stability, may be derived to best suit a particular application. Work done so far on the analysis of oscillator non-linearities as they affect the frequency scatter introduced by noise is described. The spectrums of the quadrature components of the noise for a simple model of a non-linear oscillator have been derived. (Author)

AD-274 125 Div. 8, 25
(TISTP/WH) OTS price $4.60

Microwave Physics Lab., Mountain View, Calif.
MATHEMATICAL METHODS IN THE STUDY OF WAVE PROPAGATION IN INHOMOGENEOUS MEDIA,
by A. J. Penico. 1 Feb 62, 44p. incl. illus.
(Technical rept. no. 1)
(Contract AF 30(602)2452, Proj. 5561)
(RADC TDR 62-86) Unclassified report

DESCRIPTORS: (*Plasma physics, *Electromagnetic waves, *Propagation.) Partial differential equations.

A study was made of methods of solution of Maxwell's equations in inhomogeneous isotropic plasmas. Results of that study include a discussion of a general method of reduction, for a variety of coordinate systems, of Maxwell's equations to scalar differential equations for the separate field components. In cartesian coordinates, reflection and transmission coefficients are obtained for plane wave propagating obliquely through a stratified slab of plasma of finite thickness and through a semi-infinite stratified plasma. Some discussion is included concerning total reflection and Brewster's Law in connection with stratified media. (Author)

AD-274 147 Div. 8
(TISTE/NTM) OTS price $4.60

Diamond Ordnance Fuze Labs., Washington, D. C.
DIRECT-COUPLED WAVEGUIDE FILTERS,
by Robert F. Sullivan. 12 Mar 62, 46p. incl. illus. 9 refs. (DOFL rept. no. TR-987)
(Proj. 26300)
Unclassified report

DESCRIPTORS: (*Waveguide filters, *Band-pass filters, *Superhigh frequency filters, Waveguide couplers, Radiofrequency filters, X band, Design.) (Waveguides, Coupling circuits, Tuning devices, Phase shifters, Mathematical analysis.) (Electrical properties, Resonance, Standing wave ratios, Measurement.)

Design data are presented for rapid calculation in designing direct-coupled maximally flat band-pass filters in X-band using multiple-post obstacles. The data may be used for any TE10 mode waveguide by using appropriate scaling factors. A design example is given to illustrate the design procedure, and the effects of mechanical tolerances are discussed. (Author)

AD-274 150 Div. 8
(TISTP/WH) OTS price $6.60

Pickard and Burns, Inc., Needham, Mass.
BISTATIC CROSS SECTIONS OF CYLINDRICAL WIRES,
by J. T. deBettencourt. 1961, 53p. incl. illus. table, 5 refs. (Scientific rept. no. 1; P and B Pub. no. 735A)
(Contracts AF 30(602)2412 and AF 19(604)8341)
(RADC TDR 61-285) Unclassified report

DESCRIPTORS: (*Scattering of Radio waves by Cylindrical bodies, Wire.) (Electromagnetic waves, Radiofrequency.) (*Radar echo areas, *Radar reflections.)

Bistatic scattering cross sections of a thin, perfectly conducting cylinder are developed using the variational method. This method was used by Tai (Stanford Research Institute, Tech. Rept. no. 18, March 1951) for obtaining monostatic (back scatter) radar cross sections. Resulting expressions are developed for wires of 3/2 WL/O length or less, where WL/O is the free space wavelength. The wires are assumed to be in air or vacuo. The resulting calculations apply to the case where the incident electric vector lies in the incident plane and the receiving antenna is polarized parallel to the scattering plane. (Author)

AD-274 172 Div. 8, 33
(TISTA/LSK) OTS price $2.00

National Aeronautics and Space Administration, Washington, D. C.
AN INVESTIGATION OF THE EFFECTS OF THE TIME LAG DUE TO LONG TRANSMISSION DISTANCE UPON REMOTE CONTROL. PHASE II. VEHICLE EXPERIMENTS. PHASE III. CONCLUSIONS.
Final rept.,
by James L. Adams. Apr 62, 78p. incl. illus. tables, 11 refs. (Technical note D-1351)
(In cooperation with Stanford U., Calif.)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1351.

DESCRIPTORS: (*Remote control systems, Radio signals, Servo systems, Command systems, *Time lag theory.) (Moon, Vehicles, Tracking, Display systems, Feedback, Human engineering.)

A series of pursuit tracking tests is performed with transport lags ranging from 0 to 6 seconds between the control and the controlled quantity. Target speeds are tracked with both velocity and acceleration controls. Two types of tracking are performed to bracket the actual vehicle situation. In the first the operator attempts to follow the target with his controlled quantity in real time, using the delayed position and rates as feedback. In the second he attempts to follow the target with the delayed controlled quantity. Tests are performed substituting simple electronic models for the human to gain an understanding of human response with time delays in the control loop. A series of tests with an actual vehicle are performed with the intent of relating the tracking tests to the actual situation of interest. Time delays of from 0 to 3 seconds are included in the control loop. Performance is scored at various speeds over both continuous and obstacle courses. Both 2- and 4-wheel steering were investigated. (Author)

AD-274 230 Div. 8, 30
(TISTP/TL) OTS price $2.60

California U., Los Angeles.
A TECHNIQUE FOR THE SYNTHESIS OF LINEAR, NON-STATIONARY FEEDBACK SYSTEMS. PART I. THE APPROXIMATION PROBLEM,

by A. R. Stubberud. Oct 61, 21p. incl. illus. 19 refs. (Rept. no. 61-51)
(Contract AF 49(638)438), Proj. 9783)
(AFOSR-1741) Unclassified report

DESCRIPTORS: (Synthesis of *Linear systems (Nonstationary) *Feedback (Systems).) (*Control systems, Polynomials, Functions, Time, Differential equations, Partial differential equations.)

A technique for the synthesis of linear, non-stationary feedback systems is presented. This analysis deals with the approximation problem, i.e., a method is developed whereby a realizable weighting function which produces a desired output when subjected to a polynomial input can be generated. Certain conditions which must be fulfilled by the outputs are also developed. (Author)

AD-274 231 Div. 8, 30
(TISTP/TL) OTS price $1.60

California U., Los Angeles.
A TECHNIQUE FOR THE SYNTHESIS OF LINEAR, NONSTATIONARY FEEDBACK SYSTEMS. PART II. THE SYNTHESIS PROBLEM,
by A. R. Stubberud. Oct 61, 15p. incl. illus. 19 refs. (Rept. no. 61-71)
(Contract AF 49(638)438, Proj. 9783)
(AFOSR-1742) Unclassified report

DESCRIPTORS: (Synthesis of *Linear systems (Nonstationary), *Feedback systems.) (*Control systems, Algebra, *Differential equations, Time, Functions, Polynomials, Transformations (Mathematics), Operators (Mathematics).)

A technique for the synthesis of linear, nonstationary feedback systems is presented. This paper deals with the synthesis problem; a method is developed whereby a given weighting function can be synthesized as a feedback system. The problem of synthesizing a nonstationary weighting function as a feedback system when constrained by a fixed plant is also solved. A differential equation algebra which allows the solution of these problems is developed. (Author)

AD-274 236 Div. 8
(TISTE/CDM) OTS price $4.60

Electronics Research Lab., U. of Calif., Berkeley.
THE MINIMUM PERIOD OF OSCILLATION OF SIMPLE TUNNEL DIODE OSCILLATORS,
by D. K. Lynn, R. S. Pepper, and D. O. Pederson. 2 Aug 61, 37p. incl. illus. 8 refs. (Series no. 60, Issue no. 388)
(Contract AF 49(638)1043)
(AFOSR-2275) Unclassified report

DESCRIPTORS: (*Semiconductors, *Diodes, *Oscillators, *Radiofrequency oscillations, Theory, Mathematical analysis, Non-linear differential equations.)

A study was made of the minimum period of oscillation, regardless of waveshape, for a class of electronic oscillators, one member of which is a tunnel-diode oscillator having a resistive-inductive load. Analysis shows that the minimum period of oscillation is never obtained for a harmonic mode of oscillation. The results are confirmed by experiment. Two methods of solution of the tunnel-diode oscillator equation are used. Computer solutions are used for cases of highly nonsinusoidal oscillations. If a cubic polynomial approximation to the tunnel-diode negative resistance characteristic is used, analytic solutions are found by means of a perturbation technique (Lindstedt method). From the piecewise linear solutions it is seen that there are many factors that influence the shape of the curve of period oscillation with the load parameter. The tunnel diode oscillator may operate as a soft oscillator, hard oscillator, or be truly bistable. The conditions for determining the type of operation are given. (Author)

AD-274 237 Div. 8
(TISTE/CDM) OTS price $3.60

Electronics Research Lab., U. of Calif., Berkeley.
DETERMINATION OF PHYSICAL PARAMETERS OF DRIFT TRANSISTORS HAVING A DIFFUSED COLLECTOR JUNCTION,
by A. R. Boothroyd. 11 Aug 61, 31p. incl. illus. table, 4 refs. (Series no. 60, Issue no. 391)
(Contract AF 49(638)1043)
(AFOSR-2118) Unclassified report

DESCRIPTORS: (Determination, *Physical properties, *Transistors, Silicon, Theory, Mathematical analysis, Tests, Measurement.)

A procedure for the determination of physical parameters of drift transistors with a diffused collector junction was developed on the assumption of a device model with exponential base grading. Only relatively low-frequency measurements are involved. Studies were made of a double-diffused silicon mesa unit and the results obtained suggest that the theory used may be adequate for practical application, despite discrepancies between the assumed model and the actual device. Good correlation between certain known design values of physical parameters of the device, and the values deduced from measurements, was obtained. More investigation is necessary, however, to establish the conditions of validity, accuracy and possible need for further elaboration of the approach presented. (Author)

AD-274 238 Div. 8
(TISTE/NTM) OTS price $6.60

Electronics Research Lab., U. of Calif., Berkeley.
THE EQUIANGULAR PLANE SPIRAL ANTENNA,
by R. Sussman. 15 Sep 61, 57p. incl. illus. 5 refs. (Series no. 60, Issue no. 406)
(Contract AF 49(638)1043)
(AFOSR-2265) Unclassified report

DESCRIPTORS: (*Helical antennas, Broadband, *Antenna radiation patterns, Electromagnetic fields, Polarization, Phase measurement, Mathematical analysis.) (*Antennas, Helixes, *Transmission lines, Waveguide slots, Broadband probes, Test equipment.) Biconical antennas, Antenna horns.

The equiangular plane spiral antenna belongs to the class of frequency independent antennas. The electromagnetic field of the equiangular plane spiral antenna with a finite number of arms is investigated. The pattern, the phase variation and the polarization of the field of spiral antennas with a small number of arms, as generated by various methods of excitation, are examined. A method of decomposing any complicated feeding arrangement into a set of basic feedings was developed. This method can be applied to any equally spaced plane antenna with any number of arms. Measurements on 2-, 4-, and 6-arm spiral antennas were performed. Results show that the solution recently found for the limiting case of a spiral antenna which has an infinite number of arms, can serve as a good approximation to antennas with a small number of arms. Some correction terms, which depend on the number of arms, are introduced into the solution of the infinite arm antenna, so as to get a still better approximation. (Author)

AD-274 239 Div. 8, 22
(TISTW/EET) OTS price $2.60

Laboratories for Research and Development, Franklin Inst., Philadelphia, Pa.
DEVELOPMENT OF BROAD-BAND ELECTROMAGNETIC ABSORBERS FOR ELECTROEXPLOSIVE DEVICES.
Monthly progress rept. no. 7, 1-31 Jan 62, by Paul F. Mohrbach and Robert F. Wood. 31 Jan 62, 24p. incl. illus. (Rept. no. P-B1857-7)
(Contract N178-7913)
Unclassified report

DESCRIPTORS: (*Electric detonators, *Electric igniters, *Radiofrequency attenuators, Electromagnetic waves, Hazards, Broadband, Absorption, Attenuation, Measurement, Materials, Design.) (Low frequency, Radiofrequency attenuators, Measurement, Mathematical analysis.) Ferrites, Iron compounds, Carbonyl radicals, Powders, Dielectrics, Radiofrequency filters, Phosphors, Oxides, Zinc compounds, Copper catalysts, Luminescent materials, Photosensitivity, Resistors.

Various general methods of measuring attenuation (20 kc to 40 mc) in a matched system are qualitatively evaluated. An indirect method is used to evaluate the attenuation from the complex voltage transfer ratio, which is relatively easy to measure. Protective systems of interest are those offering protection against low frequency RF energy. Consideration is given to the electroluminescence as an energy absorber, and to photoresistive devices for protective circuits; preliminary work devising tests to investigate these approaches are noted. Further, the development of dissipative circuits is discussed. Emphasis is on defining terms and developing an approach to the problem. Analog computer studies of basic dissipative networks have begun. Efforts to mold attenuators from ferrite powder are discussed. A test is discussed for determining whether reducing the center conductor area will influence attenuation. (Author)

AD-274 256 Div. 8
(TISTE/CDM) OTS price $13.50

Microwave Lab., Stanford U., Calif.
SOME EXPERIMENTS WITH NEW TYPES OF CROSSED FIELD ELECTRON GUNS,
by Thomas A. Midford. Feb 62, 187p. incl. illus. tables, 35 refs. (Scientific rept. no. 36; ML rept. no. 885)
(Contract AF 19(604)1930)
(AFCRL 62-75) Unclassified report

DESCRIPTORS: (*Electron guns, Theory, Design, Tests with *Electron beams across *Magnetic fields, *Electric fields.) (Microwave equipment, Optical systems.) Electron beams, Stability, *Space charges, *Focusing, Electrodes, Cathodes (Electron tubes), *Electron tubes, Mathematical analysis, Direct current, Measurement.

The properties of short and long types of space-charge flow crossed-field electron guns were investigated. Both types of guns were intended for use in M-type injected beam microwave devices in which, ideally, electron beams satisfy the conditions of laminar Brillouin flow. These guns are based upon the space-charge flow solution of the plane magnetron diode. The short gun was based on the exact form of this solution, while the long gun resulted from a simple approximation to this solution which was shown to be valid under certain initial conditions at the cathode. Examples of both types of guns were designed and built. In regard to emission characteristics, both behaved substantially as predicted by the theory. The short gun produced a beam which was seemingly a good approximation to planar Brillouin flow and moreover, a beam relatively free of the characteristic crossed-field instabilities. The beam from the long gun, however, was found to be unstable under certain conditions. This instability was probably related to the formation of a potential minimum associated with space-charge limited emission. (Author)

AD-274 263 Div. 8, 25, 26
(TISTM/EJH) OTS price $8.10

Pacific Semiconductors, Inc., Lawndale, Calif.
INTERDIGITATED SILICON TRANSISTOR PROGRAM.
Interim technical progress rept., 18 Sep-18 Dec 61,
by S. H. Barnes, B. Rappaport, and F. J. Steinebrey. Jan 62, 64p. illus. 12 refs.
(Contract AF 33(600)43029, Proj. 7-850)
(ASD TR 7-850, vol. 1) Unclassified report

DESCRIPTORS: (*Transistors, *Semiconductors, *Semiconducting films, Manufacturing methods, Vapors, Deposits on Single crystals, Thin films of Silicon on Boron, Silicon compounds, Dioxides, Impurities, Diffusion.) (Resistance, Electrical properties, Control.) (Vapors, Chlorides, Silanes, Decomposition.) (Phosphorus compounds, Oxychlorides.)

The objective of this program is to develop manufacturing methods for production of interdigitated comb structure Si power transistors. The substitution of an epitaxial collector process for the presen collector contact diffusion process appeared advisable both to improve device electrical characteristics and manufacturability. The choice of trichlorosilane as a source material was based on ease of decomposition in a hydrogen stream and practical considerations, such as temperature of deposition and availability in adequate purity. Three approaches to resistivity control are outlined. The preparation of wafers for epitaxial deposition is briefly considered. A vapor deposition method of producing a boron-silica base predeposition was successful. A large scale run will be re-

quired to determine if problems of control and uniformity result when a large number of wafers are treated in a batch. The design for the 20-ampere transistor (type 3-20) was completed. (Author)

AD-274 340 Div. 8
(TISTE/CDM) OTS price $12.00

David Sarnoff Research Center, Princeton, N. J.
RESEARCH AND DEVELOPMENT ON SEMICONDUCTOR PARAMETRIC AND TUNNEL DIODE MICROWAVE DEVICES.
Final rept., 1 Jan 59-31 Oct 61,
by K. K. N. Chang, G. Conrad and others.
31 Oct 61, 162p. incl. illus. tables, 29 refs.
(Contract AF 19(604)4980, Proj. 4645)
(AFCRL 62-46)
Unclassified report

DESCRIPTORS: (*Semiconductors, *Parametric amplifiers, *Microwave amplifiers, *Diodes, Design for Helixes, Parametric amplifiers, Distributed amplifiers with Coaxial cables, Microwave oscillators, Extremely high frequency, *Frequency multipliers.) (Amplifiers, Germanium, Gallium compounds, Antimonides, Design, Theory, Noise (Radio), Noise (Radar).) (Amplifiers with Negative resistance circuits, Transmission lines, Hall effect, Solid state physics.) (*Frequency shift converters, Ultra high frequency, S band, Electronic circuits, *Microwave equipment, Nonlinear systems, Pumps, Theory, Mathematical analysis.)

Contents: Parametric amplifiers; Single diode type using low frequency pumping, Cavity-type (coaxial-line distributed amplifier), Helix-type, and Millimeter wave generation by parametric method. Tunnel diode amplifiers; Characteristics, noise theory, semiconductor oscillators. Tunnel diode converters; Small pump theory, Coaxial line circuit for UHF down converter, S-band down converter, Lumped parameter circuit for UHF down converter, Method of optimization of noise factor, Large pump theory, and Millimeter wave tunnel diode down converter. Solid-state microwave devices; Negative-resistance transmission line amplifiers, and Two-port microwave devices. Germanium and GaSb tunnel diodes.

AD-274 386 Div. 8, 6
(TISTE/CRJ) OTS price $5.60

Electronic Defense Labs., Mountain View, Calif.
ANALYSIS OF AN AFC SYSTEM FOR AN AUTOMATIC SEARCH-TRACK RECEIVER,
by Harold E. Thiel and Keith E. Root. 28 Feb 62,
47p. incl. illus. 4 refs. (Technical memo. no. EDL-M443)
(Contract DA 36-039-sc-87475)
Unclassified report

DESCRIPTORS: (Automatic, Frequency, Control for *Radar receivers and *Radio receivers, Analysis.) (Detection and Tracking of Radio signals, Radar signals, Radar pulses.) Electronic circuits, Trigger circuits, Tuning circuits, Discriminators, Limiters, Frequency converters, Oscillators, Intermediate frequency amplifiers, Video amplifiers, Pulse amplifiers, Electronic integrators, Radiofrequency oscillators, Pulse discriminators, Sensitivity, Errors, Design.

The general behavior of a sampled data automatic frequency control loop for use in receiving pulsed radio frequency signals is described. A functional description of the system blocks is used to develop automatic frequency control (AFC) loop stability criteria. Tracking capabilities of the AFC loop are formulated and equations are derived to permit an estimation of frequency set errors. Design considerations are discussed. The frequency to voltage converter and the frequency control circuits are discussed in detail. (Author)

AD-274 390 Div. 8, 17, 25
(TISTE/CAM) OTS price $2.60

General Electric Co., Syracuse, N. Y.
APPLICATION OF TUNNELING TO ACTIVE DIODES.
31 Jan 62, 29p. incl. illus. (Scientific rept. no. 7b)
(Contract AF 19(604)6623)
(AFCRL-62-87b) Unclassified report

DESCRIPTORS: (*Diodes, Intermetallic compounds, *Gallium compounds, *Arsenides, *Phosphides, *Noise (Radio), Measurement.) (Crystals, Growth, Metallic compounds, Vapors, Transport properties, Chemical impurities, Low temperature research.) (Electric insulation, Conductivity, Space charges, Tests.) (Gold alloys, Antimony alloys, Germanium alloys, Tin alloys, Silver alloys, Tellurium alloys.)

Further aspects of the relationship between injection and trapping and noise effects in GaAs tunnel diodes are presented. Data are presented on several diodes, primarily, however, on a diode exhibiting noise near the Esaki component of current. An epitaxially grown GaPn, semi-insulating, n structure is described which appears to conduct by means of space-charge-limited emission, and which at higher voltages exhibits high sensitivity to visible light. Exploratory work on a GaAs pnpn four-layer device is described. The processes employed in this work, i.e. epitaxial crystal growth, diffusion, and evaporation and alloying, are discussed. (Author)

AD-274 391 Div. 8, 25
(TISTE/CAM) OTS price $4.60

General Electric Co., Syracuse, N. Y.
APPLICATIONS OF TUNNELING TO ACTIVE DIODES.
31 Jan 62, 45p. incl. illus. 33 refs. (Scientific rept. no. 7A)
(Contract AF 19(604)6623)
(AFCRL-62-87A) Unclassified report

DESCRIPTORS: (*Diodes, *Semiconductors, High temperature research, Crystals, Growth, Electrons, Diffusion, Solubility, Measurement, Electroplating, Gamma rays.) (*Gallium compounds, Arsenides, Copper, Germanium, Silicon, Potassium, Aluminum.)

Calculated curves are given showing the solubilities of substitutional and interstitial Cu in GaAs in the presence of given amounts of donor and acceptor impurities as a function of temperature. The solubility of Cu was measured in pure and extrinsic p-type GaAs, Ge, and Si, and the results give the solubilities of the substitutional and interstitial species separately. A formula is given for the effective diffusion coefficient in intrinsic and extrinsic n-type semiconductor. Curves giving the intrinsic carrier concentrations at high temperatures in Ge, Si, and various 3-5 compounds are given. An elementary theory of the liquidus curve is 3-5 compound phase diagrams is derived and compared with experiment. New data for GaP solubility in Ga are given which are much lower than that reported elsewhere. The mean free paths of hot electrons in K, Al, and Au as a function of energy are calculated using the theories developed by Wolff and Quinn. Serious discrepancies between these calculations and some recent experimental values are discussed. (Author)

9. FLUID MECHANICS

AD-273 954 Div. 9, 25
(TISTP/JW) OTS price $6.60

Mechanical Technology Inc., Latham, N. Y.
ON THE HYBRID GAS LUBRICATED JOURNAL BEARING.
Technical rept.,
by J. W. Lund. 15 Mar 62, 62p. incl. illus.
3 refs. (Rept. no. MTI-62TR2)
(Contract Nonr-373000, Proj. NR 061-131)
Unclassified report

DESCRIPTORS: (*Gas bearings, Compressible flow, Viscosity, Fluid flow.) (Partial differential equations, Perturbation theory.) (*Journal bearings, Bearings, *Lubrication.)

The load carrying capacity of an external pressurized gas journal bearing is analyzed including the hydrodynamic effect caused by the rotational speed of the journal. The analysis is an approximate first order perturbation solution, i.e. it assumes small bearing eccentricity ratio. Furthermore, it is assumed that the gas feeding takes place through orifices in the centerplane of the bearing and that the number of feeding holes is sufficiently large to be considered a line source. Results are given for the load carrying capacity and for the attitude angle. In addition an investigation is made of the validity of the approximation used in arriving at the solution. (Author)

AD-273 983 Div. 9, 15
(TISTP/TL) OTS price $11.00

Stanford U., Calif.
COMPUTATION OF THE COMPRESSIBLE LAMINAR BOUNDARY-LAYER FLOW INCLUDING DISPLACEMENT-THICKNESS INTERACTION USING FINITE-DIFFERENCE METHODS,
by I. Flugge-Lotz and F. B. Blottner. Jan 62, 129p. incl. illus. 44 refs. (Technical rept. no. 131)
(Contract AF 49(638)550)
(AFOSR-2206) Unclassified report

DESCRIPTORS: (*Aerodynamic configurations, *Laminar boundary layer, *Compressible flow, Subsonic flow, Supersonic flow, *Hypersonic flow, Viscosity.) (*Boundary layer, *Equations, *Numerical analysis, *Differential equations, *Difference equations, *Partial differential equations.) (Sheets (Flat plates), Shear stresses, Heat transfer, Stability, Shock waves.)

The equations for the laminar compressible boundary layer are presented along with the necessary boundary conditions. The equations are nondimensionalized, which results in using quantities of the same order of magnitude better suited for computations. The boundary-layer equations are also modified using the Howarth-Dorodnitsyn transformation, which results in equations advantageous for numerical computation when the flow is hypersonic. Since the boundary conditions require that the enthalpy and velocity be known at the outer edge of the boundary layer, the necessary formulas are presented to calculate the exterior flow, provided the pressure distribution is known. Finally, the characteristic values of the boundary layer (shearing stress, heat transfer, and displacement thickness) are defined. (Author)

AD-274 021 Div. 9
(TISTA/WAW) OTS price $.75

National Aeronautics and Space Administration, Washington, D. C.
SUBSONIC WIND-TUNNEL INVESTIGATION OF ERRORS INDICATED BY TOTAL-PRESSURE TUBES IN THE FLOW FIELD OF A BODY SIMULATING THE NOSE OF THE X-15 RESEARCH AIRPLANE,
by William J. Alford, Jr. Apr 62, 23p. incl. illus. table, 2 refs. (NASA Technical note D-1250)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1250.

DESCRIPTORS: (*Rocket planes, Airplane models, Wind tunnel models, Airplane noses, Airplane protuberances, Pressure, Errors, Vortices, Model tests.) (*Pitot tubes, Wind tunnels, Instrumentation.)

A wind-tunnel investigation was conducted to determine the source of errors exhibited by a secondary total-pressure tube located on the upper surface of the fuselage of the X-15 with the nose boom. The effects of model-nose configuration, of the meridian plane of the total-pressure measurements, of changes in Mach numbers, and of the addition of a transition strip were investigated. Results indicated that a model configuration employing a nose boom suffered large losses of total pressure on the upper surface of the model. These errors were presumed to result from the vorticity shed by the boom. Results indicated the lower surface would be a suitable circumferential location for the secondary total-pressure tube. Effects of increasing the Mach number from 0.60 to 0.80 and the effects of adding a transition strip to the configuration with a nose boom were negligible. Wind-tunnel measurements were in reasonable agreement with flight measurements of secondary-tube total pressures for configurations without and with nose booms. (Author)

AD-274 048 Div. 9
(TISTA/SEB) OTS price $9.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
THEORY OF HIGH SPEED IMPACT.
Summary rept., 3 Nov 60-2 Nov 61,
by T. D. Riney. Mar 62, 104p. incl. illus. tables, 41 refs.
(Contract AF 08(635)1713, Proj. 9860)
(APGC TDR 62-20) Unclassified report

DESCRIPTORS: (*Impact shock from *Hypervelocity projectiles, Meteorites, *Cratering, Cavitation, Viscosity, Stresses, Mathematical analysis, Equations, Theory.)

Results of hypervelocity impact tests were gathered and the composite data are presented. The extrapolated results to higher velocities differ with the theoretical prediction from the perfect fluid model. A visco-plastic model for hypervelocity impact is formulated. This is accomplished by introducing a viscosity factor mu sub o and a yield stress tau sub a into the perfect fluid equations. The equations governing the visco-plastic model are studied. Certain dimensionless parameters are found which determine the relative importance of the inertial, viscous and plastic effects during the various

stages of the hypervelocity cratering process. To exhibit quantitatively the importance of including the viscous and plastic effects, a one-dimensional impact model was studied. The values of mu sub o and tau sub a are varied since definitive data are available for neither parameter in the hypervelocity range. Two distinct finite difference schemes were developed for performing the required calculations. The results are related to the qualitative model of crater formations that evolved from experimental studies in which the actual cratering process was monitored. The viscous and strength effects strongly affect the cavitation process which is the essential mechanism of crater formation. (Author)

AD-274 049 Div. 9, 1, 12
(TISTA/SEB) OTS price $10.50

Grumman Aircraft Engineering Corp., Bethpage, N. Y.
CLASSIFICATION OF INTERACTIONS DUE TO HIGH-SPEED FLOWS PAST TRANSVERSE JETS,
by Louis G. Kaufman, II. Feb 62, 125p. incl. illus. tables, 19 refs. (Research rept. no. RE-154)

Unclassified report

DESCRIPTORS: (*Jets, Gas flow, Aerodynamics, Supersonics, Hypersonics, Shock waves, *Jet mixing flow, Theory, Equations, Mathematical analysis, Computers.) (High altitude, Satellite vehicles, Airplanes, Aircraft, Satellite attitude, Re-entry vehicles, Control systems.) Interference.

A preliminary analysis of flows past transverse jets indicates that if reaction jet control is used within the atmosphere strong interference effects can be expected. The assumptions necessary and earlier analyses of this problem are reviewed. A straightforward approach using two-dimensional, compressible, inviscid, perfect gas flow theory is adopted. Consistency is obtained in using the following three variables to define the problem: free stream Mach number, design Mach number of the jet nozzle, and the ratio of jet stagnation pressure to free stream static pressure. Many basically different types of interaction flows are possible depending upon the values of the variables. Different theoretical methods are necessary to evaluate widely varying interference effects. Interaction flows are classified, and values of the variables separating the different types are tabulated. Sample force calculations indicate that the induced control force may be several times larger than the pure reaction force of the jet; this is particularly true for weak jets (jets having low pressure ratio values). Three dimensional, viscid, and separation effects are qualitatively discussed. (Author)

AD-274 058 Div. 9, 25, 27
(TISTA/SEB) OTS price $4.60

Illinois U., Urbana.
EFFECT OF ELECTRIFICATION ON THE DYNAMICS OF A PARTICULATE SYSTEM.
Rept. on Proj. SQUID,
by S. L. Soo. Mar 62, 31p. illus. 19 refs.
(Technical rept. no. ILL-5-P)
(In cooperation with James Forrestal Research Center, Princeton U., N. J., Contract Nonr-185825, Proj. NR-098-038)

Unclassified report

DESCRIPTORS: (Dynamics of Particles, Solids with Space charges in Gas flow, Fluid flow through Rocket motor nozzles, Exhaust nozzles.) (Mathematical analysis, Equations.) (Magnetohydrodynamics, Plasma physics.) (*Exhaust gases, Ionization, Ions, Thermionic emission.)

The significance of electrification on the dynamics of a gas-solid system was discussed. Considerations of charge distribution include electrification due to impact with a wall and that at equilibrium between thermionic emission and space charge. The study of dynamics of charged particles showed that motion of charged particles induces electromagnetic radiation, in general, except motion involving complete spherical symmetry, that the pinch effect, due to motion of particles charged to the same sign is small except when mass velocity nears that of light, and that even a very slight charge on the solid particles will have a pronounced effect on concentration distribution and boundary layer thickness in the flow of a gas-solid system. (Author)

AD-274 094 Div. 9, 25
(TISTP/JW) OTS price $1.60

AVCO Everett Research Lab., Everett, Mass.
CURRENT DISTRIBUTION AND FLOW MODEL FOR LARGE RADIUS-RATIO MAST,
by J. C. Keck, F. Fishman and H. Petschek. Jan 62, 12p. incl. illus. 12 refs. (Research rept. no. 117)
(Contract AF 49(638)659)
(AFOSR-2194)

Unclassified report

DESCRIPTORS: (*Magnetic fields, Gas flow, *Shock tubes, *Plasma physics.) (Magnetic effects, Shock tubes, Electrical properties.)

The non-uniform flow in a magnetic annular shock tube (MAST) with an annular spacing larger than the radius of the inner cylinder is described. Experiments were conducted in a MAST with inner and outer radii of 1 and 3 inches. The speed of the disturbance produced in the tube was found to depend upon the polarity of the discharge. The distribution of current in the tube was determined with probe coils; it too, depended on polarity. With the inner electrode positive the current was largely confined to a thin sheet that was strongly canted with respect to the walls, the inner edge leading. A thicker current sheet that was nearly normal to the tube walls was observed in the inverse polarity condition. A model is proposed to explain the operation with positive center electrode. The shape of the forward part of the current sheet is calculated by balancing the magnetic pressure behind the sheet with the gas pressure in front; the Newtonian approximation is used for the gas pressure. The resulting shape, which is approximately parabolic, agrees roughly with experiment. It is proposed that the dependence of the flow on polarity is associated with electron emission problems, and that in positive operation the ions carry a substantial part of the current. (Author)

AD-274 095 Div. 9
(TISTP/TL) OTS price $3.60

AVCO Everett Research Lab., Everett, Mass.
A SHOCK TUBE STUDY OF THE COUPLING OF THE O2-Ar RATES OF DISSOCIATION AND VIBRATIONAL RELAXATION,
by Kurt L. Wray. Jan 62, 35p. incl. illus. tables, 8 refs. (Research rept. no. 125)
(Contract DA 19-020-ORD-5476)

Unclassified report

DESCRIPTORS: (*Shock tubes (Studies of) Couplings of *Oxygen, *Argon (Rates of), *Dissociation and Vibration, *Relaxation time.)

The purpose of this investigation was to determine how the dissociation rate will be affected by a lack of vibrational equilibrium. Studies of the dissociation rate of dilute O2 - Ar mixtures were made in a 24 in. diameter shock tube from 5000 - 18,000 K. The O2 concentration was monitored by its absorption of 1470A radiation. An Arrhenius plot of the data yielded a straight line from 5000 - 11,000 K, the rate constant being given by kd = 2.9 (± 12%) x 10 to the 14th power exp (-D/RT) cc/mole-sec. Above 11,000 degrees the data deviate from the line given by this equation - at 18000 degrees kd being .45 times the calculated value. An incubation time, Δt, was observed during which dissociation does not proceed to a significant extent. The ratio of this incubation time to the vibrational relaxation time (obtained by extrapolating Camac's low temperature results) when plotted against translational temperature, displays a slight negative temperature dependence. At 18,000 degrees $\Delta t/\tau v=0.4$, at 8000 degrees $\Delta t/\tau v=1$, and at 5500 degrees we estimate that $\Delta t/\tau v \approx 2$. (Author)

AD-274 109 Div. 9
(TISTA/LSK) OTS price $9.10

Minnesota U., Minneapolis.
SURVEY ON HEAT TRANSFER AT HIGH SPEEDS.
Rept. on Research on Aerodynamic Flow Fields, by Ernst R. G. Eckert. Dec 61, 94p. incl. illus. tables, 182 refs.
(Contract AF 33(616)2214, Proj. 7064)
(ARL-189; Supersedes WADC TR 54-70, AD-38 093)
Unclassified report

DESCRIPTORS: (*Bibliography on *Heat transfer at Supersonics, Hypersonics.) (Airframes, Metal plates, Surfaces, Aerodynamic heating, Laminar boundary layer, Turbulent boundary layer, Boundary layer, Turbulence, Pressure, Temperature.)

This report is a reissue of WADC TR 54-70 (AD-38 093) which presented a survey of the literature on heat transfer at high supersonic velocities published predominately in the years 1951 to 1954. The survey is essentially restricted to surfaces along which the pressure is constant, an assumption which is not too restrictive since evidence could be presented that for slender shapes, as generally used in high speed aircraft, the influence of a pressure variation on heat transfer is small. Simple relations have been collected or developed which permit the calculation of friction factors, recovery factors and heat transfer coefficients for laminar boundary layer flow along surfaces of constant temperature with an accuracy better than 3%. A greater uncertainty in the prediction of the above parameters is caused by the poor knowledge of Prandtl number values for air at high temperatures. A decided advantage of the relations presented lies in the fact that they appear to hold for any reasonable Prandtl number variation. (Author)

AD-274 122 Div. 9, 12
(TISTA/LSK) OTS price $6.60

Polytechnic Inst. of Brooklyn, N. Y.
LAMINAR, TRANSITIONAL, AND TURBULENT HEAT TRANSFER TO A CONE-CYLINDER-FLARE BODY AT MACH 8.0,
by Victor Zakkay and Clifton J. Callahan.
Feb 62, 52p. incl. illus. tables, 13 refs.
(PIBAL rept. no. 737)
(Contract AF 49(638)445, Proj. 9781)
(AFOSR-2359) Unclassified report

DESCRIPTORS: (*Guided missile noses, Conical bodies, Wind tunnel models, *Heat transfer, Laminar boundary layer, Turbulent flow, Turbulence, Boundary layer, Hypersonics, Model tests, Mathematical prediction, Theory.)

An investigation of the laminar, transitional, and turbulent heat transfer rates over a conical cylindrical flared body is presented. Regions of favorable, zero, and adverse pressure gradient on the body are investigated. Experimental results are compared with theory. The model chosen was a cone-cylinder-flare configuration consisting of 20 degrees semi-vertex conical nose portion smoothly blended by a shoulder radius into a long cylindrical body and terminated by a smooth large radius flare. The model was tested at a free stream Mach number of 8 and a Reynolds number of 1.6 to 0.3x10 to the 5th power per inch based on free stream conditions. Various stagnation-to-wall temperature ratios were obtained by cooling the model prior to the test with liquid nitrogen. The stagnation-to-wall temperature ratios ranged from 10 to 3.3. The theoretical predictions give good results for the heat transfer rates in the laminar region, and fair prediction in the transitional and turbulent regimes extending over the shoulder and forward portion of the cylindrical body. (Author)

AD-274 153 Div. 9, 25
(TISTP/WH) OTS price $3.60

Geophysics Corp. of America, Bedford, Mass.
A HEURISTIC EXAMINATION OF THE KINEMATICS OF SIMPLIFIED ROCKET TRAILS,
by J. Pressman and R. Casey. Feb 62, 31p. incl. illus. (Scientific rept. no. 2; GCA technical rept. no. 62-2-A)
(Contract AF 19(628)231, Proj. 5842)
(AFCRL 62-266) Unclassified report

DESCRIPTORS: (Guided missiles, Rocket motors, *Condensation trails.) (*Exhaust gases, Diffusion, Dynamics.) Analysis.

Individual aspects of the complex integrated behavior of missile trails are treated. Missile trail shapes are examined under simplified assumptions to give an intuitive case to later more detailed studies. The assumptions are: (1) no significant interaction between the exhaust matter (either molecules or particulate matter) and the ambient atmosphere occurs; (2) the acceleration of the rocket is assumed constant; (3) a simple cosine law of velocities is assumed for the emitted particles. The analysis indicates, in a simple fashion, some of the complex morphology and phenomena due to the kinematics of missile trails and serves as a rough guide to future work. (Author)

AD-274 170 Div. 9, 10, 25
(TISTA/LSK) OTS price $1.50

National Aeronautics and Space Administration, Washington, D. C.
EXPERIMENTAL STUDY OF THE EFFECTS OF WEIGHTLESSNESS ON THE CONFIGURATION OF MERCURY AND ALCOHOL IN SPHERICAL TANKS,

Division 9 - FLUID MECHANICS

by Donald A. Petrash, Robert F. Zappa, and Edward W. Otto. Apr 62, 62p. incl. illus. table, 50 refs. (Technical note D-1197)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1197.

DESCRIPTORS: (Physical properties of *Ethanols, *Mercury in Spheres, Propellant tanks during *Weightlessness.) (Liquid rocket propellants, Surface tension, Surface properties, Configuration, Fluid mechanics.)

As a part of the study of problems associated with the behavior of rocket engine propellants stored in space-vehicle tanks while exposed to weightlessness and solar and planetary radiant heat sources, the zero-gravity liquid configuration of several common liquids in spherical glass tanks was experimentally investigated. The zero-gravity equilibrium liquid configuration for mercury in spherical glass tanks is one in which the liquid-vapor surface is a surface of constant curvature and the mercury remains in contact with the walls at the same contact angle as was observed in the 1-g environment. The contact angle for mercury appeared to be unaffected by the level of the gravity field. The zero-gravity equilibrium liquid configuration for ethyl alcohol in spherical glass tanks is a completely wetted tank wall with a spherical vapor bubble in the interior of the liquid. The time required to wet the tank wall completely increased with an increase in the ratio of density to surface tension for carbon tetrachloride, ethyl alcohol, and water. (Author)

AD-274 180 Div. 9, 25, 1
(TISTP/WH) OTS price $3.60

Rensselaer Polytechnic Inst., Troy, N. Y.
THE FLOW OF AN INVISCID COMPRESSIBLE CONDUCTING FLUID PAST A SLENDER BODY OF AN ARBITRARY CROSS SECTION.
Technical rept. on Research on Aerodynamic Flow Fields,
by Ken-Ichi Kusukawa. Dec 61, 31p. incl. illus. 14 refs.
(Contract AF 33(616)7312, Proj. 7064)
(ARL-158) Unclassified report

DESCRIPTORS: (*Aerodynamics with respect to Airfoils in Gas flow subject to Magnetic fields.) (Drag, Lift.) (*Magnetohydrodynamics, Gas flow, Conductivity.)

The problems in magnetohydrodynamics, in which an inviscid compressible fluid with small conductivity flows steadily past a slender body of an arbitrary cross section, in the presence of an applied magnetic field parallel to the uniform flow are considered. By the use of the slender body approximation we shall discuss the character of the velocity and the magnetic fields, and obtain the drag and the lateral force exerted on the body. For examples, the flows past a body of an elliptic cross section and a body of revolution at a small incidence will be discussed. It is noticeable that the induced drag for a slender body of revolution with pointed nose and tail ends is negative, and the lift for the same body takes the negative sign for a positive incidence. (Author)

AD-274 222 Div. 9
(TISTP/TL) OTS price $1.60

Aerospace Corp., El Segundo, Calif.
THE INFLUENCE OF THE EQUILIBRIUM DISSOCIATION OF A DIATOMIC GAS ON BRAYTON-CYCLE PERFORMANCE,
by T. A. Jacobs and J. R. Lloyd. 16 Jan 62, 12p. incl. illus. 4 refs. (Rept. no. TDR-930(2230-06)TN-1)
(Contract AF 04(647)930; In cooperation with Texas U. Austin)
(DCAS TN 61-28) Unclassified report

DESCRIPTORS: (*Gases, Dissociation.) (*Low temperature research, Molecules, Entropy, Specific heat.) (*Thermodynamics, Analysis.) Differential equations.

By employing the Lighthill ideal dissociating gas approximation, the influence of the equilibrium dissociation of a diatomic molecule on Brayton-cycle performance is demonstrated. For low temperature ratios it is shown that the use of a suitably selected molecule results in a significant improvement in cycle thermal efficiency. (Author)

AD-274 251 Div. 9, 12
(TISTA/SEB) OTS price $.75

Michigan U., Ann Arbor.
FLIGHT SIMULATION OF ORBITAL AND REENTRY VEHICLES. PART IV. A STUDY OF EARTH OBLATENESS EFFECTS AND CHARACTERISTIC OSCILLATORY MOTIONS OF A LIFTING REENTRY VEHICLE.
Rept. for June 60-Nov 61, on Training Equipment, Simulators, and Techniques for Air Force Systems,
by Gabriel Isakson. Dec 61, 20p. incl. illus. table, 8 refs.
(Contract AF 33(616)8385, Proj. 6114; Continuation of Contract AF 33(616)5664)
(ASD TR 61-171, pt. 4) Unclassified report

DESCRIPTORS: (*Re-entry vehicles, Simulation of Flight, Re-entry aerodynamics, Lift, Gravity, Celestial mechanics, Motion, Oscillation, Theory, Mathematical analysis.) (Geometry, Configuration of Earth, Surfaces.) Satellite vehicles, Triangular wings.

The report is concerned with two distinct aspects of the simulation problem for a lifting reentry vehicle. The first relates to the effects of earth oblateness on the flight path. The effects of oblateness of the gravity field on the orbital motion of a satellite are surveyed and are found to be small for a single orbit, probably sufficiently small to be neglected in a simulation for training purposes. Some of these effects are cumulative and would become substantial in a flight of long duration. The effects of oblateness of the earth's surface and atmosphere on the reentry trajectory are studied independently of the gravity oblateness effects. Typical trajectories are computed for the case of a nonrotating earth. Under the most extreme conditions, there is found to be a change in range of 690 nautical miles for a nominal once-around flight. The second aspect relates to the characteristic oscillatory motion of the vehicle during reentry. Pertinent literature on this topic is surveyed. Approximate expressions for the period of the characteristic long-period and short-period oscillations are presented. (Author)

AD-274 321 Div. 9, 25
(TISTP/TL) OTS price $5.60

Naval Ordnance Lab., White Oak, Md.
HEAT TRANSFER IN DISSOCIATED AIR BY A TWO-THICKNESS INTEGRAL METHOD. PART II. THE ZERO PRESSURE GRADIENT LAMINAR BOUNDARY LAYER,
by John O. Powers and Edgar Krahn. 15 Dec 61, 19p. illus. tables, 12 refs. (Aeroballistics research rept. no. 149; Rept. no. NOLTR 61-25)
Unclassified report

DESCRIPTORS: (*Heat transfer in Dissociation, Air by a two thickness *Integrals method, Thermodynamics, Transport properties, Gas flow.) (Polynomials, Transformations (Mathematics), Differential equations.) Zero pressure in *Laminar boundary layer.

The two-thickness integral method of determining boundary-layer characteristics has previously been shown to provide reasonable results for stagnation-point flows even when the effects of equilibrium air dissociation are considered. This result implied that the method may have more general application and it therefore seemed advisable to explore additional characteristics of the method to further assess the extent of its applicability. The zero pressure gradient case, with its associated limiting cases, i.e., zero Mach number and zero heat transfer, has been used as a basis for this further evaluation primarily because of the availability for comparison of computations performed by exact methods. In general, it appears that of the profile representations considered, a two-parameter, sixth-degree velocity profile gives the most desirable results for a flat plate when used with the present method. (Author)

AD-274 327 Div. 9, 1
(TISTA/LSK) OTS price $1.00

National Aeronautics and Space Administration, Washington, D. C.
FORCE-TEST INVESTIGATION OF A MODEL OF AN AERIAL VEHICLE SUPPORTED BY FOUR UNSHROUDED PROPELLERS,
by Robert H. Kirby. Apr 62, 35p. incl. illus. 5 refs. (Technical note D-1234)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1234.

DESCRIPTORS: (*Flying platforms with Aerial propellers.) (Model tests of Control systems, Stability (Lateral), Stability (Longitudinal), Pitch, Roll, Aerodynamic data, Model tests.)

A wind-tunnel investigation was made to study the static longitudinal and lateral stability and trim characteristics of a simplified model of an aerial vehicle supported by four unshrouded propellers that were fixed with respect to the airframe so that the propeller plane of rotation was horizontal for hovering flight. The investigation showed that this unshrouded-propeller configuration required half the nose-down attitude for forward flight, experienced about half the nose-up pitching moment, and had about half the attitude instability of a shrouded-propeller configuration of the same general size. The results also showed that horizontal and vertical tails were required to give satisfactory stability and trim characteristics at the higher forward speeds. (Author)

AD-274 330 Div. 9, 1
(TISTA/LSK) OTS price $1.00

National Aeronautics and Space Administration, Washington, D. C.,
A TABULATION OF SECTION AERODYNAMIC CHARACTERISTICS AT MACH NUMBERS OF 1.61 AND 2.01 FOR FOUR SWEPT WINGS HAVING THE SAME PLATFORM BUT DIFFERENT SURFACE SHAPES,
by Emma Jean Landrum. Apr 62, 36p. incl. illus. tables, 3 refs.
(Technical note D-1244)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1244.

DESCRIPTORS: (*Sweptback wings, Semispan models, Wind tunnel models, Pitching, Stability (Longitudinal), Gust loads, Load distribution, Pressure, Reynolds number, Aerodynamics, Model tests.)

The section normal-force and pitching-moment coefficients for four sweepback wings with different surface shapes are tabulated. All the wings had NACA 65A005 thickness distributions, 50 degrees of sweepback at the quarter chord, a taper ratio of 0.20, and an aspect ratio of 3.5. There were three twisted wings and one flat wing. The twisted wings had 6 degrees of washout at the tip, but the twist variation along the span was either linear, quadratic, or cubic. The wings were tested at Mach numbers of 1.61 and 2.01 with fixed and free transition through a Reynolds number range of 1.7 to 3.6 x 10 to the 6th power. Angle-of-attack range was from -20 to 20 degrees. (Author)

AD-274 355 Div. 9
(TISTA/SEB) OTS price $2.60

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
INITIAL STUDY OF THE EFFECT OF CRYOSURFACE GEOMETRY ON CRYOPUMPING,
by J. A. Collins, Jr., J. D. Haygood, and E. S. J. Wang. Apr 62, 18p. incl. illus. tables, 7 refs.
(AEDC TDR 62-46)
(Contract AF 40(600)800, Proj. 8951)
Unclassified report

DESCRIPTORS: (*Cryogenics, Pumps, *Fluid mechanics, Fluids, Liquefied gases, *Fluid flow, Theory, Tests.) (Molecules, Surface properties, Pressure.) (Wind tunnels, Vacuum systems, Superaerodynamics.) Surfaces, Geometry.

An experimental study of cryogenic pumping using several cryosurfaces in the pressure ranges of .0001 and.001 mm Hg is presented. At these pressures, where the mean free path of the condensable gas is on the order of the cryosurface dimensions, it is shown that the pumping rate is no longer a constant as it is in free-molecular flow, but increases through what is termed the transition range and presumably approaches a higher constant value in the continuum flow regime. Flow in the gas kinetic, gas dynamic, and transition regimes is discussed. Experimental results are presented showing the effects on cryopumping of the addition of fins or ribs to a cryosurface, and the effect of pumping with parallel cryosurfaces at different separations. (Author)

AD-274 385 Div. 9
(TISTP/TL) OTS price $2.60

Institute of Engineering Research, U. of Calif., Berkeley.
CYLINDER DRAG IN THE TRANSITION FROM CONTINUUM TO FREE MOLECULE FLOW,

by G. J. Maslach and S. A. Schaaf. 20 Mar 62, 18p. illus. 22 refs. (Rept. no. HE-150-194; Series 20, Issue 138)
(Contract Nonr-22245)
Unclassified report

DESCRIPTORS: (*Sheets and *Cylindrical bodies, *Drag in a *Supersonic flow, *Continuum mechanics, *Molecules, Gas flow, Viscosity.) (Heat transfer, *Supernerodynamics, Mach number.)

The drag coefficients for cylinders normal to the flow have been determined experimentally at approximately Mach 2, 4, and 6 with Knudsen numbers extending from continuum conditions to free molecule flow conditions. The results indicate a smooth transition from inviscid values at low Knudsen numbers to free molecule flow predictions for diffuse reflections at high Knudsen number. Small departure theories which are applicable to the near free molecule flow regime are compared to the experimental data. (Author)

10. FUELS AND COMBUSTION

AD-273 952 Div. 10
(TISTA/SEB) OTS price $7.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
LAMINAR FLAME THEORY AND THE STEADY, LINEAR BURNING OF A MONOPROPELLANT.
Technical note,
by W. E. Johnson and W. Nachbar. Mar 62, 62p. 14 refs. (Rept. no. 3-64-61-3)
(Contract AF 49(638)412)
(AFOSR-2101) Unclassified report

DESCRIPTORS: (*Liquid rocket propellants, Ignition, *Combustion, Flames, Flame propagation, Theory, Mathematical analysis, Statistical analysis.)

A nonlinear eigenvalue problem in one dimension is formulated. This mathematical problem represents both the steady burning of a monopropellant in one dimension and the laminar propagation of a deflagration wave in a uniform combustible gas. The formulation developed assumes a one-step, reversible, exothermic chemical reaction in an n-component gaseous mixture having arbitrary proportions and a Lewis number of unity A rigorous analysis of this problem is made, and the following results are among those obtained. Existence and uniqueness of the solution (i.e., eigenvalue plus eigenfunction) to the eigenvalue problem are established. The qualitative dependence of the eigenvalue (or burning rate) upon several of the important parameters is determined. Upper and lower bounds for the eigenvalue are derived, and a convergent, monotone, iterative procedure is developed for calculation of the solution to the eigenvalue problem. (Author)

AD-274 077 Div. 10
(TISTM/GEC) OTS price $2.60

Rocketdyne, Canoga Park, Calif.
RESEARCH IN HYBRID COMBUSTION.
Quarterly progress rept. for period ending 28 Feb 62,
by M. V. Peck and T. Houser. 31 Mar 62, 24p. incl. illus. tables, 7 refs. (Rept. no. R-2267-6)
(Contract Nonr-301600)
Unclassified report

DESCRIPTORS: (*Hybrid rocket propellants, Rocket oxidizers, Combustion, Theory, Mathematical analysis, Reynolds number.) (Oxygen, Aluminum, Acrylic resins, Polymers, Styrenes, Ethylenes.) (Combustion chamber gases, Test methods.)

The combustion processes of four fuels with gaseous O at two flowrates were investigated. The mass burning rates were determined for sheet stock and cast plexiglass, 30% Al in plexiglass, polystyrene, and polyethylene. The burning behavior of polystyrene, which was different from that of the other fuels, was explained by diffusion considerations. The mass regression rate of plexiglass decreased with burning time for the two O flowrates investigated, which was consistent with a diffusion mechanism. (Author)

AD-274 118 Div. 10
(TISTA/SEB) OTS price $14.00

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
THERMOPHYSICAL PROPERTIES OF CERTAIN AVIATION FUELS IN THE LIQUID AND GASEOUS STATE (COLLECTION OF ARTICLES) (Teplofizicheskiye Svoystva Nekotorykh Aviatsionnykh Topliv v Zhidkom I Gazoobraznom Sostoyanii).
3 Apr 62, 201p. incl. illus. tables, refs.
(Trans. no. FTD TT-61-81 of Gosudarstvennoye Nauchno-Tekhnicheskoye Izdatel'stvo Oborongiz Moskva, vol. 132:pp. 1-161, 1961)
Unclassified report

DESCRIPTORS: (*Aviation fuels, *Jet engine fuels, *Handbooks, USSR, Thermochemistry, Heat, *Thermodynamics, Viscosity, Density, Surface tension, Vaporization, Thermal conductivity, Physical properties, Test methods, Test equipment, Tests.) Kerosene, Gasoline, Heptanes, Hydrocarbons.

The collection gives the results of investigations of heat capacity, thermal conductivity, density, viscosity, surface tension and vapor pressure, and latent heat of vaporization of aviation fuels in the liquid and gaseous phases over a wide range of temperatures. Results are also given for investigations of diffusion in mixtures of vapors of certain fuels and air at high temperatures. (Author)

AD-274 124 Div. 10, 27, 30
(TISTP/TL) OTS price $8.10

Princeton U., N. J.
TRANSIENT PRESSURE MEASURING METHODS. TRANSIENT PRESSURE TRANSDUCER DESIGN AND EVALUATION,
by Howland B. Jones, Jr. Feb 62, 81p. incl. illus. table, 14 refs. (Aeronautical engineering rept. no. 595b)
(Contract NASr-36)
Unclassified report

DESCRIPTORS: (*Transducers, *Pressure, Measurement, Design, Tests, Calibration.) (*Heat transfer, Vibration, Oscillation, Damping, Stability of Liquid rocket propellants, Combustion, Rocket motors, Combustion chambers.) Non-destructive testing, Rocket motors.

The analysis covers basic transducer design,

including the vibratory system, heat transfer characteristics, application of such specialized transducers to rocket chambers, and a description of a static and dynamic calibration system. The shortcomings of present transducers, such as lack of heat ability and limited frequency response are discussed, and are the target of the tests described. (Author)

AD-274 132 Div. 10
(TISTA/SEB) OTS price $3.60

Stanford Research Inst., Menlo Park, Calif.
ABSTRACTS OF PAPERS: JOINT MEETING OF AFOSR CONTRACTORS IN SOLID ROCKET COMBUSTION AND THE PANEL ON SOLID PROPELLANT COMBUSTION INSTABILITY, HELD AT STANFORD RESEARCH INSTITUTE, MENLO PARK, CALIFORNIA, MARCH 7, 8, 9, 1962.
Apr 62, 31p.
(AFOSR-2348)
Unclassified report

DESCRIPTORS: (*Conferences on *Solid rocket propellants, Propellant grains, *Combustion, Instability, Resonance, Jet acoustic oscillations, Pressure.) (Detonation, Ignition, Decomposition.) Boron, Mechanical properties, Stresses, Shear stresses.

AD-274 144 Div. 10
(TISTA/SEB) OTS price $3.60

Aeronutronic, Newport Beach, Calif.
STUDY OF DETONATION BEHAVIOR OF SOLID PROPELLANTS.
Quarterly rept. no. 1,
by M. H. Boyer and D. A. Schermerhorn.
20 Apr 62, 33p. incl. illus. table, 10 refs.
(Publication no. U-1625)
(Contract NOw 62-0503-c)
Unclassified report

DESCRIPTORS: (*Solid rocket propellants, Rocket oxidizers, Rocket fuels, Binders, Propellant grains, Combustion, *Detonation, *Detonation waves, Mathematical analysis, Equations, Computers, Theory.) (TNT, Detonation.) Combustion chamber gases, Pressure, Equations of state, Volume.

The present status of the one-dimensional computer routine is discussed including recent modifications in the grain burning phase of the reaction process. Calculations of minimum pressure for initiation of TNT are presented and compared with experimental values. Use of such comparisons for determining the rate parameters of the ignition process are considered. Calculations are also presented on the detonation behavior of a typical composite double-base propellant. Minimum pressures for initiation, reaction and pressure profiles through the wave, and wave trajectory, are shown. The material is found to be marginal for support of a steady state detonation. The theoretical backgound for the planned experiments on the equation of state of solids is discussed. (Author)

AD-274 198 Div. 10, 15
(TISTA/SEB) OTS price $4.60

Aeronutronic, Newport Beach, Calif.
PERFORMANCE OPTIMIZATION OF MULTI-COMPONENT PROPELLANT MIXTURES. VOLUME I. MATHEMATICAL PROCEDURES AND PROGRAMMING.
Final rept.,
by B. Kubert, D. Piper and others. 12 Jan 62, 43p. incl. illus. (Publication no. C-1569, vol. 1)
(Contract AF 04(611)7020)
(SSD TDR 62-22, vol. 1) Unclassified report

DESCRIPTORS: (Mathematical prediction using Computers for Determination of *Specific impulse, *Solid rocket propellants, *Liquid rocket propellants.) (Statistical analysis, Mathematical analysis, Equations.) Programming.

A computer program is described which can directly determine the composition which yields maximum impulse for multicomponent propellant mixtures. The method has been coded for IBM 709 and 7090 computers and has been demonstrated for systems containing up to four components. The mathematics was determined so that the technique is applicable to systems containing up to ten components but, thus far, it has only been applied to systems containing two to five components. The computation proceeds directly to the optimum point; consequently, an economy of machine time over conventional procedures is realized. The program can be used in conjunction with any accurate performance computational program. (Author)

AD-274 201 Div. 10, 12, 26, 30
(TISTM/BRW) OTS price $4.60

Beech Aircraft Corp., Boulder, Colo.
ESTABLISHING PROVEN DESIGN CRITERIA FOR CRYOGENIC BOOST TANKS.
Quarterly progress rept. no. 10, 1 Nov 61-31 Jan 62,
by J. G. Connelly and B. R. Etheridge. Mar 62, 42p. incl. illus. (Engineering rept. no. 13531)
(Contract AF 33(616)5154, Proj. 3084)
(DGRP TR 62-4)
Unclassified report

DESCRIPTORS: (Guided missiles, Booster rockets, *Liquid rocket propellants, Cryogenics, Liquefied gases, Hydrogen, Fuel tanks, *Propellant tanks, Titanium, Stainless steel, Thermal insulation, Manufacturing methods, Welding, Welds, Cylindrical bodies, Conical bodies, Hemispherical shells.) Test equipment, Test facilities, Test methods, Tests, Hydrostatic pressure, Deformation, Strain gages, Temperature, Measurement.

In the thermal simulation test program the progress on the 7,000-gallon test tank system fabrication, pre-test program and the thermal test facility is reported. A description of the fabrication progress and hydrostatic test of the titanium test tank and thermal testing of the stainless steel test tank is presented. A description of the facility program is also presented. (Author)

AD-274 308 Div. 10
(TISTA/SEB) OTS price $1.60

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
PREDICTION OF THE EFFECTS OF STORAGE ON ARP PROPELLANT BY MEANS OF CHEMICAL ANALYSIS,
by Milton Roth and M. R. Younginer. Mar 62, 16p. incl. illus. tables, 8 refs. (Technical notes no. FRL-TN-126)
(Proj. no. OMS 4120.28.3012.1.01.44)
Unclassified report

DESCRIPTORS: (*Solid rocket propellants, Deterioration, Viscosity, Stability during Storage, Tests, Test methods, Chemical analysis, Mathematical analysis, Mathematical prediction, Equations.) Fuel additives.

A study of the effects of storage at 65.5 and 80 C on the stabilizer content and viscosity of ARP propellant was made. The viscosity results were erratic but, like the stabilizer results, were found to show a definite deterioration trend. Least square analyses of both the viscosity and stabilizer data led to the derivation of simple, linear equations relating these properties with time at either of the temperatures studied. The relationship was extended to any temperature, by application of the Arrhenius equation, so that it is now possible to predict the viscosity or stabilizer content of this type of propellant any desired time at any given storage temperature. The need is shown for obtaining more information concerning the validity of the predictions as well as relating these laboratory tests with storage safety and functioning. (Author)

AD-274 357 Div. 10
(TISTP/TL) OTS price $5.60

Applied Physics Lab., Johns Hopkins U., Silver Spring, Md.
FLAME INHIBITION RESEARCH.
Quarterly progress rept., 1 Aug-31 Oct 60 and Yearly Summary, 1 Nov 60-31 Oct 61.
Nov 61, 46p. incl. illus. tables, refs. (Rept. no. TG 376-4)
(Contract NOrd-7386)
Unclassified report

DESCRIPTORS: (*Flames, Inhibition.) (*Flame propagation, Fuel additives, Methanes, Oxygen, Hydrogen compounds, Bromides, Free radicals, Atoms, Halogens.) (Thermal diffusion, Reaction kinetics, Thermodynamics, Microstructure, Transport properties.) (Ethylenes, Fluorides, Polymers, Glass, Ceramic materials.)

A temperature profile was measured on the spherical stoichiometric methane-oxygen-argon flame system whose composition structure was reported in TG 331-2. The diffusion coefficient of the system A-H2 (trace) was measured at atmospheric pressure over the range 300-1070 K. An analysis was made of the effect of added HBr on fluxes and rates on the stoichiometric methane flame. This indicated that a significant fraction of the reaction occurred on the surface of the ball. The principal effect of the added HBr appears to be the shifting of the methane reaction to appreciably higher temperatures. (Author)

11. GROUND TRANSPORTATION EQUIPMENT

No Entries

12. GUIDED MISSILES

AD-273 996 Div. 12, 15
(TISTW/DLW) OTS price $2.60

Air Force Office of Scientific Research, Washington, D. C.
PROBABILITY CONSIDERATIONS ON DESTROYING ICBM'S WITH INTERCEPTOR SATELLITES,
by Herbert Knothe. Nov 61, 22p. (AFOSR/DRA-61-3)
Unclassified report

DESCRIPTORS: (*Guided missiles, Surface to surface, *Interception probabilities using *Satellite vehicles, Probability, Statistical functions, Polynomials, Mathematical analysis.)

A method is presented for calculating the probability that a certain minimum number of a set of ICBM's can be destroyed by a given number of interceptor satellites. (Author)

AD-274 020 Div. 12, 2
(TISTA/WAW) OTS price $.75

National Aeronautics and Space Administration, Washington, D. C.
THE STRUCTURE OF THE EXPLORER X MAGNETOMETER SPACE PROBE,
by E. D. Angulo and R. K. Browning. Apr 62, 24p. incl. illus. tables (NASA Technical note D-1175)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1175.

DESCRIPTORS: (*Satellite vehicles, Space probes, Instrumentation, Electronic equipment, Radio transmitters, Data transmission systems, *Magnetometers, Rubidium, Vapor plating, Vapors, Installation.) (*Airframes, Spin stabilized ammunition, Design, Tests, Manufacturing methods.) (Cosmic rays, Magnetic fields, Measurement.)

The Explorer X was designed primarily to house scientific equipment and allied electronics for a rubidium vapor magnetometer experiment in interplanetary space. A plasma probe for investigating low energy positive particles constituted the secondary experimental equipment in the payload. Power for approximately 60 hours of flight was provided by 35 pounds of silver-zinc batteries. The structure provided spin stabilization and was compatible with the low drag fairing of the Delta vehicle. Thermal control for the payload was maintained by a vaporized coating of aluminum on the exterior surfaces, coupled with a pattern of dull aluminum paint. All materials used in the structure were nonmagnetic; and the use of the lightest materials possible resulted in a total payload weight of 79 pounds. (Author)

AD-274 052 Div. 12, 25
(TISTA/VGW) OTS price $1.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
EXPERIMENTAL DETERMINATION OF THE THERMAL RADIATION PROPERTIES OF TEMPERATURE CONTROL SURFACES FOR SPACECRAFT,

by E. R. Streed. 1962, 14p. incl. illus. 3 refs. (Preprint no. 5-76-62-7)
Unclassified report

Spacecraft Thermodynamics Symposium, LMSC Research Labs., Palo Alto, Calif., 28 Mar 1962.

DESCRIPTORS: (*Symposia on *Thermodynamics, *Spaceships, Space probes, Satellite vehicles.) (Surface properties, *Temperature control, *Thermal radiation, Solar energy, Absorption, Reflection, Spectrographic data, *Spectrophotometers, Infrared spectrophotometers, Thermocouples.)

More versatile, reliable, and sophisticated spacecraft and payloads demand continued measurement of the radiation characteristics of existing and promising thermal control surfaces. Measurements are being performed for (1) optical materials research, (2) coating-surface finish development, (3) precise data for thermal design purposes, and (4) production control and final inspection. Examples of work performed in each of these areas and a description of the equipment used are presented. Techniques and apparatus utilizing reflectance, absorptance, and emittance phenomena are described for the solar and infrared spectral regions. (Author)

AD-274 053 Div. 12, 16
(TISTB/CCH) OTS price $1.75

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
A SURVEY OF BIOASTRONAUTICS 1961-1962 RESOURCES FOR RESEARCH AND DEVELOPMENT,
ed. by William J. White. Feb 62, 57p. incl. tables.
(Contract AF 18(600)1916)
(HQAFSC TDR 62-1) Unclassified report

DESCRIPTORS: (*Space flight, *Manned, *Scientific research, Space medicine, Behavior, *Human engineering, Stress (Physiology), Stress (Psychology).) (*Computers, Logistics, Costs.) (*Personnel, Scientific personnel, Engineering personnel, Training.) Space environmental conditions, Simulation.

Foremost among the questions to be answered by future exploration of space are those concerned with bioastronautics. A research and development program for manned space flight during the next two decades will serve both to establish human productivity in space-based systems and to stimulate the advancement of concepts of military action for exploiting human capabilities. Information and ideas which must be considered in the formulation of a long range program aimed at manned exploration and use of outer space are discussed. (Author)

AD-274 108 Div. 12, 25
(TISTA/LSK) OTS price $4.60

Land-Air, Inc., Point Mugu, Calif.
ON THE DYNAMICS OF NEAR-EARTH FLIGHT,
by Bernard G. Grunebaum. 15 Feb 62, 41p.
(Rept. no. 32)
(Contract N123(61756)19425A)
Unclassified report

DESCRIPTORS: (Satellite vehicles, Orbital flight paths, *Satellite vehicle trajectories, *Dynamics, Celestial mechanics, Perturbation theory, Mathematical analysis, Theory, Equations, Differential equations.) (Digital computers, Programming.)

Equations for near-earth and satellite flights are developed. The use of experimental parameters is avoided as much as possible. Differential equations that defy analytical solution are made a quasi-linear type so numerical integration can be performed with close error bounds. The equations consider both thrust and ballistic phases and enable separate numerical analysis of such effects as oblateness, air drag, earth rotation. All analytical data were assumed to be determinable from doppler radar and/or Transit equipment and the algorithms achieve a reasonable compromise between accuracy and speed. (Author)

AD-274 113 Div. 12, 2
(TISTA/LSK) OTS price $7.60

Naval Supersonic Lab., Mass. Inst. of Tech., Cambridge.
A STUDY OF SATELLITE DECAY WITH THE FIRST AND SECOND ORDER GRAVITATIONAL POTENTIAL,
by R. E. Good. June 61, 68p. incl. illus. tables, 14 refs. (Technical rept. no. 465)
(Contract AF 19(604)5894)
Unclassified report

DESCRIPTORS: (*Satellite vehicles, Orbital flight paths, Satellite vehicle trajectories, Life expectancy, Motion, Gravity, *Celestial mechanics, Perturbation theory, Theory, Mathematical analysis, Mathematical prediction, Differential equations.)

The decay of earth satellites was analyzed using both a numerical integration and an approximate method. The numerical integration utilizes the variation-of-parameter method with second order earth gravitational potential. The approximate method was developed via conservation of energy equation but for unexplained reasons would not agree with observed satellite decay without the inclusion of an additional linear eccentricity factor. Including (e/100) to the 0.366 power permitted the approximate method to agree with numerical calculations and observed data. The usual restriction of approximate methods at low eccentricities was removed by the addition of a non-linear term previously computed numerically. The linear approximate method was valid for linear eccentricities larger than 150. The effect of a variable drag coefficient and projected area was an important factor and of the order e squared. (Author)

AD-274 123 Div. 12, 8
(TISTP/WH) OTS price $3.60

Purdue U., Lafayette, Ind.
QUENCHING OF ADAPTIVE CONTROL SYSTEM RESPONSE TO TEST SIGNAL,
by Rufus Oldenburger and Luther Schrock.
Mar 62, 25p. incl. illus. 8 refs. (Technical rept. no. 1)
(Contract Nonr-110020)
Unclassified report

DESCRIPTORS: *Control systems, *Feedback, Signals, Damping, Differential equations.

In adaptive control, a test signal may be used to identify the parameters of the system to be controlled. It is desirable to eliminate the

effects of this signal as soon as the identification has been completed, since the test signals disturb the system. An adaptive control is proposed in which the switches are closed during normal operation and open for the period of identification. The switches may be omitted, but then the computation becomes much more difficult. A test signal is used for identification to eliminate the effects of the test signal. The theory is restricted to controlled systems described by linear differential equations with constant coefficients. The form of the equation is known at the start but not the values of the coefficients which are parameters. It is assumed that the parameters of the system vary slowly enough so that they may be considered constant during identification. (Author)

AD-274 161 Div. 12, 25
(TISTA/LSK) OTS price $2.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
DISCOVERER ORBITAL THERMODYNAMIC DESIGN-PREDICTIONS AND FLIGHT DATA CORRELATION,
by H. Cohan and E. A. LaBlanc. 1962, 28p. incl. illus. 4 refs. (Preprint no. 5-76-62-5)
Unclassified report

Spacecraft Thermodynamics Symposium, LMSC Research Labs., Palo Alto, Calif., 28 Mar 1962.

DESCRIPTORS: (Mathematical prediction, Equations for Heat, Solar energy, Albedo (Astronomy), Heat production, Thermal radiation, Space environmental conditions, *Thermodynamics of *Satellite vehicles in Orbital flight paths.) (Guided missile batteries, Electrical equipment, Heat production.) (*Temperature control, Radiators, Paints, Heat transfer, Heat exchangers.) *Symposia.

Methods used for predicting space vehicle structural and equipment temperatures on orbit are presented. The energy balance between the vehicle, deep space, the sun, and the earth is applied to determine dynamic temperature histories for vehicle equipment. Data received from vehicles on orbit are compared to predictions. Certain anomalies are investigated and their causes determined. Application of flight results to vehicle design and prediction methods is described. (Author)

AD-274 162 Div. 12
(TISTA/LSK) OTS price $2.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
EFFECTS OF THE SPACECRAFT ENVIRONMENT ON THERMAL CONTROL MATERIALS CHARACTERISTICS,
by L. A. McKellar. 1962, 24p. incl. illus. tables, 18 refs. (Preprint no. 5-76-62-8)
Unclassified report

Spacecraft Thermodynamics Symposium, LMSC Research Labs., Palo Alto, Calif., 28 Mar 1962.

DESCRIPTORS: (*Satellite vehicles, Space environmental conditions, Thermal radiation, Solar energy, Heat, Heat production, *Thermodynamics.) (*Temperature control of Surfaces by Absorption, Reflection, Heat transfer, Radiators, Paints.) (Radiation effects on Materials.) *Symposia.

The importance of thermal radiation characteristics in the thermal design of an orbiting satellite is noted. The various constituents of the spacecraft environment are outlined with their expected effects. Experimental programs in progress at LMSC to investigate these effects are described. Some implications of simultaneous exposure to the total space environment are mentioned. Thermal control material stability information is reviewed; information on surfaces is related to four basic surfaces for passive thermal control: (1) solar absorber, (2) solar reflector, (3) flat absorber, and (4) flat reflector. (Author)

AD-274 163 Div. 12
(TISTA/LSK) OTS price $4.60

Lockheed Aircraft Corp., Sunnyvale, Calif.
THERMAL AND ATMOSPHERIC CONTROL IN BIOASTRONAUTIC SYSTEMS,
by J. M. Smith, R. B. Jagow and G. R. Werth. 1962, 42p. incl. illus. tables, 18 refs. (Preprint no. 5-76-62-9)
Unclassified report

Spacecraft Thermodynamics Symposium, LMSC Research Labs., Palo Alto, Calif., 28 Mar 1962.

DESCRIPTORS: (*Satellite vehicles, Spaceship cabins, *Closed-cycle ecological systems, *Controlled atmosphere, *Temperature control, Humidity, Cooling.) (Spaceships, Thermodynamics, *Symposia.)

The design and development of thermal and atmospheric control systems for spacecraft to orbit large primates is discussed. The evolution of design concepts, the analytical methods employed, and problems encountered during the development of such systems are summarized. Studies of systems suitable for manned spacecraft are discussed, with particular emphasis on the nearly closed regenerable-type system. (Author)

AD-274 290 Div. 12, 28
(TISTB/AW) OTS price $11.50

American Machine and Foundry Co., Greenwich, Conn.
HUMAN FACTORS ENGINEERING REVIEW AND EVALUATION OF TITAN WEAPON SYSTEM 107A-2 LAUNCHER, OSTF AND TF-1, VOLUME I.
Final rept.,
by Leo Bricker, Lewis W. Bennett, and Rona Finizie Malhenzie. 31 Jan 62, 1v. incl. illus. tables (Rept. no. TS 7.2.36, vol. 1)
(Contract AF 04(647)138)
Unclassified report

DESCRIPTORS: (*Human engineering, *Guided missile launchers, Maintenance, Operation, Control panels, Display systems.) (*Safety, Hazards, Maintenance personnel.)

AD-274 291 Div. 12, 28
(TISTB/AW) OTS price $11.00

American Machine and Foundry Co., Greenwich, Conn.
HUMAN FACTORS ENGINEERING REVIEW AND EVALUATION OF TITAN WEAPON SYSTEM 107A-2 LAUNCHER, OSTF AND TF-1. VOLUME II.
Final rept.
31 Jan 62, 146p. incl. illus. tables, refs. (Rept. no. TS 7.2.36, vol. 2)
(Contract AF 04(647)138)
Unclassified report

DESCRIPTORS: (*Human engineering, *Guided missile launchers, Maintenance, Operation, Control panels, Display systems.) (*Safety, Hazards, Maintenance personnel, Portable platforms, Dollies.)

AD-274 292 Div. 12, 28
(TISTB/AW) OTS price $10.10

American Machine and Foundry Co., Greenwich, Conn.
HUMAN FACTORS ENGINEERING REVIEW AND EVALUATION OF TITAN WEAPON SYSTEM 107A-2 LAUNCHER, OSTF AND TF-1, VOLUME III.
Final rept., 31 Jan 62, 122p. incl. tables, refs.
(Rept. no. TS 7.2.36, vol. 3)
(Contract AF 04(647)138)
Unclassified report

DESCRIPTORS: (*Human engineering, *Guided missile launchers, Maintenance, Errors, Analysis, Operation, Control panels, Display systems, *Safety.)

AD-274 342 Div. 12, 2
(TISTA/LSK) OTS price $4.60

Astrophysical Observatory, Smithsonian Institution, Cambridge, Mass.
CATALOG OF PRECISELY REDUCED OBSERVATIONS NO. P-2.
Rept. on Research in Space Science,
by George Veis. 12 Feb 62, 45p. incl. tables, 4 refs. (Special rept. no. 85)
(Sponsored by National Aeronautics and Space Administration)
Unclassified report

DESCRIPTORS: (*Satellite vehicles, Orbital flight paths, Tracking telescopes, Astronomical data, Tables.)

Contents:
Precisely Reduced Observations of
- Satellite 1959 alpha-1 from July 1 through December 31, 1959
- Satellite 1959 alpha-2 from March 6 through May 31, 1959
- Satellite 1960 iota-2 from September 10 through December 31, 1960
- Satellite 1960 Omicron from launch November 13 through November 16, 1960
- Satellite 1960 Sigma from launch December 8 through December 10, 1960

AD-274 343 Div. 12, 2
(TISTA/LSK) OTS price $5.60

Astrophysical Observatory, Smithsonian Institution, Cambridge, Mass.
SATELLITE ORBITAL DATA.
Rept. on Research in Space Science,
by I. G. Izsak. 21 Feb 62, 54p. incl. tables.
(Special rept. no. 86)
Unclassified report

DESCRIPTORS: (*Satellite vehicles, Orbital flight paths, Tracking telescopes, Astronomical data, Tables.)

Contents:
Orbital Elements
- Satellite 1958 Alpha (Explorer I), January 1 through July 1, 1961
- Satellite 1958 Beta 1 (carrier rocket, Vanguard I), January 1 through July 27, 1961
- Satellite 1959 Iota 1 (Explorer VII), December 31, 1960, through July 1, 1961
- Satellite 1960 Xi 1 (Explorer VIII), November 4, 1960, through July 3, 1961
- Satellite 1961 Delta 1 (Explorer IX), February 16 through July 2, 1961
- Satellite 1961 Nu 1 (Explorer XI), April 28 through September 1, 1961

AD-274 344 Div. 12, 2
(TISTA/LSK) OTS price $6.60

Astrophysical Observatory, Smithsonian Institution, Cambridge, Mass.
CATALOGUE OF SATELLITE OBSERVATIONS NO. C-25.
Rept. on Research in Space Science,
by D. V. Mechau. 23 Feb 62, 62p. incl. tables.
(Special rept. no. 87)
(Sponsored by National Aeronautics and Space Administration)
Unclassified report

DESCRIPTORS: (*Satellite vehicles, Orbital flight paths, Tracking telescopes, Astronomical data, Tables.)

Contents: Observations of Satellite 1958 Alpha (Explorer I): January 1 through June 30, 1961. Observations of Satellite 1958 Beta 1 (carrier rocket, Vanguard I): January 1 through June 30, 1961. Observations of Satellite 1958 Delta 2 (Sputnik III). Observations of Satellite 1958 Zeta 1 (Atlas). Observations of Satellite 1959 Alpha 1 (Vanguard II): January 1 through June 30, 1961. Observations of Satellite 1959 Alpha 2 (carrier rocket, Vanguard II): January 1 through June 30, 1961; Additions to previous observation listings. Observations of Satellite 1959 Eta (Vanguard III): January 1 through June 30, 1961. Observations of Satellite 1959 Iota 1 (Explorer VII): January 1 through June 30, 1961; Additions to previous observation listings. Observations of Satellite 1960 Beta 1 (carrier rocket, Tiros I). Observations of Satellite 1960 Beta 2 (Tiros I); Additions to previous observation listings. Observations of Satellite 1960 Gamma 1 (carrier rocket, Transit 1B): Additions to previous observation listings. Observations of Satellite 1960 Gamma 2 (Transit 1B); Additions to previous observation listings.

AD-274 345 Div. 12, 2
(TISTA/LSK) OTS price $11.00

Astrophysical Observatory, Smithsonian Institution, Cambridge, Mass.
CATALOGUE OF SATELLITE OBSERVATIONS NO. C-26.
Rept. on Research in Space Science,
by D. V. Mechau. 23 Feb 62, 138p. incl. tables.
(Special rept. no. 88)
(Sponsored by National Aeronautics and Space Administration)
Unclassified report

DESCRIPTORS: (*Satellite vehicles, Orbital flight paths, Tracking telescopes, Astronomical data, Tables.)

Contents:
Observations of Satellite 1960 Iota 1 (Echo I)
- January 1 through June 30, 1961
- Additions to previous observation listings
- Corrections to previous observation listings

Observations of Satellite 1960 Iota 2 (carrier rocket, Echo I)
- January 1 through June 30, 1961
- Additions to previous observation listings

AD-274 346 Div. 12, 2
(TISTA/LSK) OTS price $7.60

Astrophysical Observatory, Smithsonian Institution, Cambridge, Mass.
CATALOGUE OF SATELLITE OBSERVATIONS NO. C-27.

Rept. on Research in Space Science,
by D. V. Mechau. 23 Feb 62, 76p. incl. tables.
(Special rept. no. 89)
(Sponsored by National Aeronautics and Space Administration)
Unclassified report

DESCRIPTORS: (*Satellite vehicles, Orbital flight paths, Tracking telescopes, Astronomical data, Tables.)

Contents:
Observations of Satellite 1960 Xi 1 (Explorer VIII) November 3, 1960, through June 30, 1961
Observations of Satellite 1961 Delta 1 (Explorer IX) February 16 through June 30, 1961
Observations of Satellite 1961 Nu 1 (Explorer XI) April 27 through June 30, 1961

AD-274 347 Div. 12, 2
(TISTA/LSK) OTS price $2.60

Astrophysical Observatory, Smithsonian Institution, Cambridge, Mass.
ON THE CRITICAL INCLINATION IN SATELLITE THEORY.
Rept. on Research in Space Science,
by Imre G. Izsak. 14 Mar 62, 24p. incl. illus. 16 refs. (Special rept. no. 90)
(Sponsored by National Aeronautics and Space Administration)
Unclassified report

Presented at a colloquium with the Theoretical Division of the Goddard Space Flight Center in Greenbelt, Md., November 30, 1961.

DESCRIPTORS: (*Satellite vehicles, Orbital flight paths, Satellite vehicle trajectories, Satellite attitude, *Celestial mechanics, Perturbation theory.)

The long-range perturbations of an artificial satellite are investigated in the vicinity of the critical inclination, considering the effect of the second and fourth zonal harmonics in the earth's gravitational field. The traditional remedy to avoid the small divisor by developing into powers of square root of J sub 2 instead of J sub 2 fails even in this relatively simple case. A more involved converging development is given to represent the trajectories. The qualitative properties of the trajectories alter when the eccentricity at the critical inclination becomes smaller than a quantity of the order square root of J sub 2. For the case of small eccentricities the use of Poincare type variables is convenient. (Author)

AD-274 351 Div. 12, 27
(TISTW/DLW) OTS price $6.60

Martin Marietta Corp., Baltimore, Md.
TITAN II. DYNA SOAR.
Destruct test and analysis rept.,
by H. Hunter and E. Larsh. 15 Mar 62, 56p. incl. illus. tables (Rept. no. ER-12269)
(Contract AF 04(695)54)
Unclassified report

DESCRIPTORS: (*Booster rockets, Propellant tanks, *Liquid rocket propellants, *Rocket oxidizers, *Destructors, Demolitions, Design, Model tests.) (Rocket fuels, Rocket oxidizers, Hydrazines, Methyl hydrazines, Nitrogen compounds, Tetroxides, Combustion, Exhaust gases, Toxicity, Measurement.) (*Hypervelocity vehicles, Booster rockets, Design.)

The use of storable, high energy and hypergolic propellants, Unsymmetrical Dimethyl Hydrazine (UDMH)/Hydrazine and Nitrogen Tetroxide (N204), in Titan II and Titan III is an advancement in weapon and space systems. However, the intermixing reaction and toxicological properties of these propellants introduced a problem in the design of the destruct system for the booster. Tests were conducted to develop and verify a booster destruct system for use with these propellants. (Author)

AD-274 361 Div. 12, 1
(TISTA/SEB) OTS price $2.60

Army Ordnance Missile Command, Redstone Arsenal, Huntsville, Ala.
THE LIMITATIONS OF THE CORRELATION METHOD FOR DETERMINING THE WIND INFLUENCE UPON MISSILES,
by Oskar M. Essenwanger. 18 Dec 61, 29p. incl. illus. tables, 7 refs. (Rept. no. RR-TR-61-35)
Unclassified report

DESCRIPTORS: (*Guided missiles, *Booster rockets, Launching, *Wind, Gust loads, Load distribution, Aerodynamics, Buckling, Failure (Mechanics), Theory, Statistical analysis, Mathematical analysis.)

Two major objections of the correlation method, using the linear inter- and intra-level correlation coefficients, are explained, and a comparison is made with two other systems, the monthly mean profile and a recently developed characteristic method. For good achievements, the correlation method is restricted to the use of parameters from the jet stream layer. In contrast, the characteristics method promises successful application for a variety of parameter selections, even from the lower stratosphere. This is explainable by the connection of the individual profile with certain weather types whose reflections are found at all levels.

13. INSTALLATIONS AND CONSTRUCTION

AD-274 294 Div. 13, 22, 20
(TISTE/NTM) OTS price $8.10

American Machine and Foundry Co., Niles, Ill.
STUDY OF THE USE OF MODELS TO SIMULATE DYNAMICALLY LOADED UNDERGROUND STRUCTURES.
Final rept.
Feb 62, 77p. incl. illus. tables, 8 refs.
(Contract AF 29(601)4374, Proj. 1080)
(AFSWC TDR 62-3) Unclassified report

DESCRIPTORS: (*Underground structures, Soils, Air blast, Load distribution, *Thermonuclear experiments, Model tests, Dynamics, Simulation, Mathematical analysis.) (Underground structures, *Nuclear explosions, Blast, Pressure, *Shock tubes, Stresses, Statistical analysis, Theory.) (Propagation and Attenuation of *Shock waves, Damping.)

The results are presented of an analytical investigation of the use of models to simulate

dynamically loaded structures buried under the ground. Scaling laws were proposed relating the model structure and soil medium to the corresponding prototype components. Physical properties of some materials were presented as a guide in choosing possible model simulants and a method presented for simulating soils. This represents the initial effort towards a solution of the dynamic similitude problem. (Author)

14. MATERIALS (NON-METALLIC)

AD-273 997 Div. 14
(TISTM/BRW) OTS price $3.60

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
GROWTH AND MECHANICAL PROPERTIES OF FILAMENTARY SILICON CARBIDE CRYSTALS.
Rept. for Jan 60-Jan 61 on Nonmetallic and Composite Materials,
by Luke A. Yerkovich and Henry P. Kirchner.
Aug 61, 32p. incl. illus. tables, 17 refs.
(Contract AF 33(616)7005, Proj. 7340)
(WADD TR 61-252) Unclassified report

DESCRIPTORS: (*Single crystals, *Silicon compounds, *Carbides, Production, Growth by Pyrolysis of Methyl radicals, Chlorides, Silanes.) (Elasticity, Mechanical properties, Tensile properties, Physical properties, Density, Determination.) Test equipment, Test methods, X-ray diffraction analysis.

SiC whiskers were grown under various experimental conditions. The strength and modulus of elasticity of several whiskers were determined at room temperature. Methods of heating the whiskers for high temperature measurements were investigated. The specific gravity of the whiskers was inferred from measurement of the unit cell dimensions by X-ray diffraction patterns. SiC whiskers were grown by pyrolysis of methyltrichlorosilane in hydrogen. In some cases dense growths of whiskers from 1.2 to 1.5 cm in length and from 2 to 5 microns in diameter were observed. The longest whisker obtained was 5 cm in length. The tensile strength ranged from 100,400 to 1,650,000 psi. The elastic strain at failure varied from 0.41 to 1.10 per cent and the observed values of elastic modulus varied from 12,700,000 to 123,300,000 psi. These results indicate that SiC whiskers can be strong, high modulus of elasticity materials. (Author)

AD-274 129 Div. 14, 13
(TISTM/EJH) OTS price $5.60

Structural Mechanics Research Lab., U. of Texas, Austin.
SHOCK MITIGATION WITH LIGHTWEIGHT VERMICULITE CONCRETE,
by Richard Shield, Ervin S. Perry and others.
Feb 62, 53p. incl. illus. table, 7 refs.
(Contract DA 49-146-XZ-028)
(DASA-1263)
Unclassified report

DESCRIPTORS: (*Underground structures, Materials, *Concrete, Cement, *Acoustic insulation, Vibration isolators, Vermiculite, Impact shock, Shock resistance, Deformation, Stresses, Attenuation, Test methods, Test equipment.) (Nuclear explosions, Atomic bomb explosions.)

The impact cushioning characteristics of lightweight vermiculite concrete are presented in the form of acceleration-time and stress-strain curves. Data are included which show the effect of impact velocity and material thickness on the cushioning properties. Impact energy was provided by a projectile fired from an air gun. The conclusions apply to the velocity range of 24 to 120 fps. The results of this investigation are essentially in agreement with those obtained with the 275-ft drop tower using the fixed force-plate-dynamometer technique. Both the initial peak crushing stress and the average crushing stress of this vermiculite concrete, having a damp density of about 50 lb/cu ft, (moisture content of approximately 28 per cent by volume) increased with impact velocity. For an increase in impact velocity of from 24 to 120 ft/sec, the initial peak stress increased from 570 to 650 psi, and the average crushing stress to the strain at which bottoming began increased from 310 to 550 psi. The average static crushing stress for the confined concrete was 270 psi. The smallest strain at which bottoming began was about 35%. The time after impact when bottoming occurred depended on impact velocity and specimen thickness. (Author)

AD-274 148 Div. 14, 25
(TISTM/BRW) OTS price $2.50

Defense Metals Information Center, Columbus, Ohio.
THE EMITTANCE OF CERAMICS AND GRAPHITES,
by W. D. Wood, H. W. Deem, and C. F. Lucks.
28 Mar 62, 106p. incl. illus. tables, 11 refs.
(DMIC memo. no. 148)
(Contract AF 33(616)7747, Proj. 2(8-8975))
Unclassified report

DESCRIPTORS: (*Ceramic materials, *Graphite, Thermal radiation, Blackbody radiation, Absorption, Heat transfer from Surfaces.) (*Carbides of Silicon compounds, Tantalum compounds, Tungsten compounds, Zirconium compounds, Nickel alloyed with Titanium compounds.) (*Nitrides of Boron compounds.) (*Oxides of Aluminum compounds, Beryllium compounds, Magnesium compounds, Zirconium compounds.) (*Silicides of Molybdenum compounds.) Data, Tables.

A compilation of original test data on emittance, reflectance, and transmittance of ceramics and graphites is presented. The data were taken from the literature published during the period 1940-1959, inclusive, and as much of the 1960 literature as could be obtained. In many cases the descriptions in the literature are a summary of methods and results, and a complete evaluation is impossible. Curves which indicate the most probable values for the various conditions and materials are included. (Author)

AD-274 171 Div. 14
(TISTM/EJH) OTS price $.50

National Aeronautics and Space Administration, Washington, D. C.
COMPATIBILITY OF SEVERAL PLASTICS AND ELASTOMERS WITH SODIUM, POTASSIUM, AND RUBIDIUM,
by Louis Rosenblum and Henry Putre. Apr 62, 17p. incl. illus. tables, 11 refs. (Technical note D-1284)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1284.

DESCRIPTORS: (Compatibility of *Plastics, *Elastomers, Fluorocarbons, Synthetic rubber, Butyl rubber with *Alkali metals, Liquid metals, Sodium, Potassium, Rubidium, Contamination, Deterioration, Test methods, High temperature research.) (Physical properties, Mechanical properties, Tensile properties.)

Fourteen representative plastic and elastomer samples were immersed in Na K, or Rb from 3 to 10 days at 250 or 350 F to determine their compatibility with these alkali metals. Changes in weight, hardness, tensile strength, percent elongation, and flexibility were measured, and changes in appearance were noted. A selection was made of materials that were expected to yield minimum contamination to the alkali metals and that showed no appreciable degradation of physical properties under the various conditions of time and temperature. First and second selections were as follows: First, Na at 250 degrees, Kel-F 3700; Na at 350 degrees, Neoprene; K at 250 degrees, Buna-S; Rb at 245 degrees, Neoprene; Buna-N was the second selection for the 4 categories. (Author)

AD-274 183 Div. 14, 8, 26
(TISTM/BRW) OTS price $4.60

Rutgers U. School of Ceramics, New Brunswick, N. J.
DEVELOPMENT OF REFRACTORY CERAMICS THAT CAN BE PROCESSED AT TEMPERATURES CONSIDERABLY LOWER THAN THEIR MAXIMUM USE TEMPERATURE.
Quarterly progress rept. no. 5, 1 Dec 61-1 Mar 62,
by Edward J. Smoke and John H. Koenig. 1 Mar 62, 36p. incl. illus. table, 2 refs.
(Contract NOw 61-0211-c)
Unclassified report

DESCRIPTORS: (*Radomes, Materials, Processing, Temperature.) (*Refractory materials, *Ceramic materials, Aluminum compounds, Magnesium compounds, Silicon compounds, Oxides, Preparation, Sintering.) (Physical properties, Density, Crystal structure, Porosity, Solid state physics.)

A study was initiated on the densification mechanisms of high alumina bodies that utilized the presintering process in their fabrication. Evidence is presented that the initial or presintering fire promotes the formation of phases that act as potent fluxes for the alumina in the final fire. A program is set up to determine the nature of the phases formed in the initial firing. An initial attempt to utilize the devitrification mechanisms for producing a high quality refractory composition is reported. A 92% alumina composition was flame sprayed resulting in a glass that contains some alumina crystals. Differential thermal analysis and X-ray analysis indicated that a devitrifiable glass was produced. (Author)

AD-274 211 Div. 14, 17, 12
(TISTM/GEC) OTS price $1.60

General Dynamics/Astronautics, San Diego, Calif.
COMPILATION OF MATERIALS RESEARCH DATA.
Summary rept. no. 2 on Phase 2, 1 Sep 61-1 Mar 62,
by P. Bergstedt. 1 Mar 62, 12p. (Rept. no. AE 62-0060-1)
(Contract AF 33(616)7984)
Unclassified report

DESCRIPTORS: (*Cryogenics, *Adhesives, *Resin adhesives, Stainless steel (301, 304, 310), Aluminum alloys (2014, 2219, 5456), Titanium alloys, Fracture (Mechanics), Mechanical properties.) (Space environmental conditions, Pneumatic devices, Plastics, Elastomers, Adhesion, Lubrication, Thermal expansion, Thermal insulation.) (*High temperature research, *Heat resistant alloys, Refractory materials, Stainless steel (301, H11), Titanium alloys, Refractory coatings, *Metals, *Alloys, Niobium alloys (FS 82).) (Spaceships, Satellite vehicles.)

Contents: Mechanical properties of adhesives at cryogenic temperatures, Self-rigidizing and ultra-light-weight structures, Properties of organic materials in space environments, Adhesion and lubrication in space environment, High temperature properties of selected high temperature alloys, High temperature protective coatings for refractory metals, Crack propagation at cryogenic temperatures, Use of gettering agents for maintaining high vacua, Thermal expansion of space vehicle materials, and Advanced thermal insulation systems for aerospace vehicles.

AD-274 229 Div. 14, 4
(TISTM/EJH) OTS price $3.60

Borden Co., Philadelphia, Pa.
STUDY LEADING TO THE DEVELOPMENT OF HIGH TEMPERATURE RESISTANT ADHESIVES.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 61,
by K. C. Tsou, H. E. Hoyt and B. D. Halpern. 31 Dec 61, 25p. incl. illus. tables, 2 refs.
(Contract DA 36-034-ORD-3501)
Unclassified report

DESCRIPTORS: (*Resin adhesives, *Heat resistant polymers, High temperature research, Synthesis, Mechanical properties, Molecular weight, Molecular structure, Spectrographic analysis.) (*Polymers, Methyl radicals, Bromides, Methanes, Allyl radicals, Phenols, Polymerization, Copolymerization.) (*Adhesives for Stainless steel, Manufacturing methods, Test methods.)

At 500 F, the copolymer (50:50) of 2,6-dimethyl-4-bromophenol and 2-methyl-6-allyl-4-bromophenol retained a greater percentage of its room temperature shear strength when compared to polyxylenol. It is likely that the unsaturation in the allyl group result in some cross-linking. The amine-cured bromo-substituted polyxylenols were too brittle to be of any further interest to the adhesive program. (Author)

AD-274 296 Div. 14, 26
(TISTM/BRW) OTS price $3.60

Armour Research Foundation, Chicago, Ill.
INVESTIGATION OF GLASS FIBER STRENGTH ENHANCEMENT THROUGH BUNDLE DRAWING.
Quarterly rept. no. 4, 7 Oct 61-6 Jan 62,
by N. A. Weil and J. S. Islinger. Mar 62, 27p. incl. illus. tables, refs.
(Contract NOw 61-0259-c)
Unclassified report

DESCRIPTORS: (*Glass textiles, Fibers, Manufacturing methods, Drawing (Machine processing), Industrial equipment, Tensile properties, Processing, Theory, Viscosity, Temperature, Configuration.) (Metal coatings of Aluminum alloys and Silicon alloys or Lead alloys and Indium alloys on Glass, Tests.)

Progress is reported on a theoretical investiga-

tion (1) to ascertain whether theory would predict an absolute lower limit on the fiber diameter attainable in single-filament drawing operations, and (2) to determine the specific effect of various parameters upon this limiting value. A series of fiber drawing experiments was undertaken to continue efforts to improve the metal coating procedure for glass fibers and to continue the efforts of determining the feasibility of the bundle drawing technique in producing ultra-fine glass fibers. (Author)

AD-274 309 Div. 14, 26, 12
(TISTM/BRW) OTS price $4.60

Goodyear Aircraft Corp., Akron, Ohio.
STRUCTURAL FABRIC PROGRAM.
Interim technical progress rept., 1 Jan-31 Mar 62 on Structural Fabric Program, by J. O. Miller and E. Bilsky. Mar 62, 43p. incl. illus. table.
(Contract AF 33(600)43036, Proj. 7-904)
(ASD TR 7-904, vol. 3) Unclassified report

DESCRIPTORS: (Gliders, Re-entry vehicles, Structures, Materials.) (*Textiles, *Metallic textiles, Wire, Nickel alloys (Rene 41), Cobalt alloys, *Synthetic fibers, Dacron, Nylon thread, Nylon, Threads, *Industrial equipment, *Machines, Design, Specifications.)

A structural fabric investigation, related to aerospace applications, was initiated to provide a means of manufacturing large low-density Airmat structures made of metallic cloth and yarns capable of small volume packaging. The effort included an investigation into the problem of drop yarn entanglement as found after weaving the prototype Airmat sample. As a result of new sample weaving studies, it was determined that the intra-weave method of producing deep Airmat was not feasible, whereupon a new method was evolved utilizing a mechanical drop yarn extension system which proved to be entirely feasible. It was then decided to proceed with the loom design and to include this new method of producing deep Airmat. These efforts are directed toward the development of a loom procurement specification and the actual procurement of a loom capable of producing a low density Airmat in the order of 10- to 20-ft wide with a maximum depth of 8 feet. (Author)

AD-274 331 Div. 14, 20
(TISTM/EJH) OTS price $2.60

General Dynamics/Fort Worth, Tex.
STRESS-STRAIN BEHAVIOR OF IRRADIATED POLYURETHANE ELASTOMERS,
by P. M. Johnson and E. G. Fritz. 23 Feb 62, 30p. 4 refs. (Document no. NARF-62-2T; MR-N-293)
Unclassified report

DESCRIPTORS: (*Elastomers, *Polymers, *Urethanes, Radiation effects, Gamma rays, Neutron bombardment, Dosage, Temperature, High temperature research, Low temperature research, Stresses, Mechanical properties, Tensile properties, Theory.) *Vulcanizates.

The applicability of the Martin-Roth-Stiehler stress-strain relationship to a number of reactor-irradiated (gamma-ray dose (D) range: 0 - 1.9 x 10 to the 10th power ergs/gram in carbon) polyurethane elastomers was demonstrated. For each level of dose and irradiation temperature, the stress-strain values showed remarkably good agreement with the behavior predicted by this relationship, thus permitting a realistic characterization of the stress-strain curves up to extension ratios of 3 by two parameters (the tangent modulus E sub o and a coefficient K). While the available data did not justify conclusive inferences regarding the explicit nature of the functions E sub o (D) and K(D), it appears from this analysis that E sub o varies exponentially with dose D and that K is a slowly varying function of dose. (Author)

AD-274 332 Div. 14
(TISTM/BRW) OTS price $6.60

Narmco Industries, Inc., San Diego, Calif.
ESTABLISHMENT OF THE POTENTIAL OF FLAKE REINFORCED LAMINATES AS ENGINEERING STRUCTURAL MATERIALS.
Final rept., 1 Jan 61-28 Feb 62, by D. Stevens. Mar 62, 52p. incl. illus. tables.
(Contract NOw 61-0305-c)
Unclassified report

DESCRIPTORS: (*Laminates, *Reinforcing materials, *Glass, Glass textiles, *Mica, Disks, Films, Plastics, Structures, Materials.) (Processing, Filament wound construction, Casting, Molding, Hydrostatic pressure.) (Tests, Stresses, Deformation, Mechanical properties, Electrical properties, Tensile properties.) (Beams, Cylindrical bodies, Rocket motor nozzles, Containers, Screw threads, Battery compartments.)

The fundamental structural properties of flake reinforced plastics were advanced in detail, and advantageous applications of flake composites were determined. Combinations of flake with glass fibers were tested and their structural potential is discussed. The theoretical work conducted predicts inherent stress concentrations of up to 8 times the nominal stress in circular flake composites. The fabrication of cylinders and shapes other than flat plates using preformed, b-staged sheets of flake composite material and fluid molding pressure is reported to have advantages over other fabrication methods. (Author)

AD-274 337 Div. 14, 17
(TISTB/AW) OTS price $5.60

Republic Aviation Corp., Farmingdale, N. Y.
COMPILATION OF UNPUBLISHED MATERIALS INFORMATION.
Semi-annual rept. no. 2, Nov 61-Mar 62. 31 Mar 62, 45p. (Rept. no. RAC 357-5)
(Contract AF 33(616)8084, Proj. 1(8-7381))
Unclassified report

DESCRIPTORS: (*Materials, Metals, *Refractory materials, Alloys.) (Fracture (Mechanics), Stresses, Damping, Structures, Welding.) (Electronics, Electronic systems, Guidance.) (Seals, Hydraulic systems, Hydraulic fluids.) (Coatings, Niobium, Oxidation.) (Rivets, Aluminum alloys, Chemical milling.) (Titanium alloys, Beryllium, Iron, Stainless steel, Plastics.) (Solar cells, Silicon.)

Summaries are presented of some of the materials programs at the Republic Aviation Corporation. They reflect the scope of Republic's non-proprietary materials research on metallics and special purpose materials in the areas of fundamental research, applied research and development, engineering evaluation, processing development, and testing techniques. The programs vary in complexity from a sophisticated study of fracture phenomena to a routine evaluation of crazing in acrylics. Each summary describes the objective and current progress of the materials programs reported. (Author)

AD-274 375 Div. 14, 25
(TISTM/BRW) OTS price $9.60

Institute of Engineering Research, U. of Calif., Berkeley.
THERMAL STRESS-STRAIN DISTRIBUTION IN A TRANSVERSELY ANISOTROPIC MATERIAL DURING TRANSIENT HEATING,
by Bob Hiro Suzuki. 30 Mar 62, 109p. incl. illus. 24 refs. (Technical rept. no. HE-150-196; Series 128, Issue 8)
Unclassified report

DESCRIPTORS: (*Graphite, Sheets, High temperature research, *Thermal stresses, Thermal expansion, Measurement, Deformation, Mechanical properties, Elasticity, Temperature, Stresses, Mathematical analysis.) (Heating, Test equipment, Strain gages, Optical instruments, Extensometers, Collimators, Aerodynamic heating, Simulation.) Re-entry vehicles, Materials, Structures.

The potential of pyrolytic graphite as a skin structure for re-entry vehicles led to an investigation of its thermal and mechanical behavior during transient heating and at elevated temperatures. The general 3-dimensional equations of thermoelasticity are developed for a material whose properties exhibit the same anisotropic behavior as those of pyrolytic graphite. The equations are solved exactly for 2-dimensional temperature distribution which closely approximates the temperatures measured experimentally in pyrolytic graphite plates. An oxyacetylene flame apparatus was used to subject 1/8- and 1/4-in.-thick pyrolytic graphite plates to transient heating. The temperature distribution through the thickness and along the length of the plates was measured. An experimental technique was developed for measuring transient strains up to a temperature of 1500 F using a Tuckerman optical strain gage. The technique was applied to measure the thermal strain variation in the heated pyrolytic graphite plates. (Author)

AD-274 379 Div. 14, 17
(TISTM/BRW) OTS price $10.50

Clevite Corp., Cleveland, Ohio.
FIBER REINFORCEMENT OF METALLIC AND NONMETALLIC COMPOSITES. PHASE I. STATE OF ART AND BIBLIOGRAPHY OF FIBER METALLURGY.
Interim technical engineering rept. 2 Oct 61-16 Jan 62,
by R. H. Baskey. Feb 62, 140p. incl. illus. tables, 293 refs.
(Contract AF 33(657)7139, Proj. 7-924)
(ASD TR 7-924, vol. 1)
Unclassified report

DESCRIPTORS: (*Reinforcing materials, *Glass textiles, *Ceramic fibers, *Metallic textiles, *Fibers, Wire, Single crystals, Metals, Ceramic materials, Graphite, Production, Drawing (Machine processing), Extrusion, Casting, Growth, Mechanical properties, Physical properties, Bibliography.

Progress in fiber metallurgy is summarized. Whiskers possess the maximum strength but are not available commercially. The survey confirms that of the three fibers available, (glass, ceramic, or metal) only glass fibers are used extensively to reinforce material. Metal fibers have a limited commercial application as a reinforcing agent. In instances where metal fibers are used to reinforce metals, the processes are still laboratory or pilot plant size. Part I of this survey presents a review of the current state-of-the-art on strengthening theories, methods of producing fibers, or whiskers, methods of reinforcing composites with fibers or whiskers, and whisker formation. Part II is a bibliography of fiber metallurgy and consists of abstracts of each of the 293 articles or patents covered by the survey. The bibliography covers the following topics: (1) production and properties of metal fibers, (2) production and properties of ceramic or glass fibers, (3) reinforcing composites with fibers, fiberglas, or wire, (4) whisker growth mechanisms, and (5) reinforcing composites with whiskers. (Author)

15. MATHEMATICS

AD-273 956 Div. 15
(TISTP/JW) OTS price $.50

Midwest Research Inst., Kansas City, Mo.
POLYNOMIAL EXPANSIONS OF BESSEL FUNCTIONS AND SOME ASSOCIATED FUNCTIONS.
Rept. for Oct 59-July 60,
by J. Jet Wimp. Apr 61, 15p. 15 refs.
(Contract AF 33(616)6535, Proj. 7062)
(WADD TR 60-902) Unclassified report

DESCRIPTORS: (*Bessel functions, Polynomials, Integral transforms, Functions.)

In this report we first determine representations for the Anger-Weber functions $\mathfrak{J}_\nu(ax)$ and $\mathbb{E}_\nu(ax)$ in series of symmetric Jacobi polynomials. (These include Legendre and Chebyshev polynomials as special cases.) If ν is an integer, these become expansions for the Bessel function of the first kind, since $\mathfrak{J}_n(ax) = J_n(ax)$. Next, corresponding representations are found for $(ax)^{-\nu}J_\nu(ax)$. Convenient error bounds are obtained for the Chebyshev cases of the above expansions. In the final section of the report we determine the similar type expansions for the Bessel functions $Y_n(ax)$ and $K_n(ax)$. (Author)

AD-274 002 Div. 15
(TISTP/JW) OTS price $8.10

Hamburg U. (Germany).
THE MATHEMATICAL THEORY OF QUASI ORDER, SEMI GROUPS OF IDEMPOTENTS AND NONCOMMUTATIVE LATTICES. A NEW FIELD OF MODERN ALGEBRA.
Final rept. no. 1,
by Pascual Jordan. 1961, 84p. incl. tables.
(Contract AF 61(052)147)
(ARL-228) Unclassified report

DESCRIPTORS: (Mathematical logic, *Algebra, *Groups (Mathematics).)

The theory of skew lattices is discussed and the greater part of known important results concerning this field is covered. The systematical trend of the new mathematical theory is clearly seen so that the details find their appropriate frame. (Author)

AD-274 019 Div. 15
(TISTP/GRW) OTS price $5.60

Northwestern U., Evanston, Ill.
AN ELEMENTARY PROBABILITY APPROACH TO FLUCTUATION THEORY,
by Sidney C. Port. 15 Mar 62, 54p. incl. illus. 18 refs.
(Contract AF 49(638)877)
Unclassified report

DESCRIPTORS: (Complex variables, Statistical functions, *Statistical distributions, *Probability, Combinatorial analysis.)

Problems connected with the fluctuation of the sums of independent and identically distributed random variables are discussed. Basically these problems consist in finding the distribution of various functions which are definable in terms of the sums and which give a measure (in some sense) of the amount of oscillation which the sums undergo. (Author)

AD-274 100 Div. 15
(TISTP/JW) OTS price $8.10

Carnegie Inst. of Tech., Pittsburgh, Pa.
ON SOME TRANSFORMATIONS IN THE ANALYSIS OF VARIANCE.
Rept. on Mathematical Techniques of Aeromechanics,
by E. G. Olds, M. Branson, and R. E. Odeh.
Dec 61, 75p. incl. tables, 39 refs.
(Contract AF 33(616)3878, Proj. 7071)
(ARL-89) Unclassified report

DESCRIPTORS: (*Analysis of variance, Functions, Transformations (Mathematics).) (Sampling, Distribution theory, *Mathematical logic.) (Tables, Nuclear theory.)

Details are given of further results which have been obtained for the Log-variance test applied to the Analysis of Variance of Variances; an alternative method, the Log-range test, is proposed. Transformations in the Analysis of Variance are discussed, and a test is proposed for deciding whether or not to transform the data. Finally, investigation into the problems when the sample variates are not independent is mentioned. The topics included in this discussion are the transformation of the variates, and the effect upon the distribution of sample range. (Author)

AD-274 181 Div. 15
(TISTP/GRW) OTS price $3.60

RAND Corp., Santa Monica, Calif.
WIDTHS AND HEIGHTS OF (0,1)-MATRICES,
by D. R. Fulkerson and H. J. Ryser. Mar 62, 35p. incl. table, 14 refs. (Research memo. no. RM-2896-PR)
(Contract AF 49(638)700, Proj. RAND)
Unclassified report

DESCRIPTORS: (*Matrix algebra, *Combinatorial analysis, Sequences.)

Let A be an m by n (0, 1)-matrix, and suppose that E* is an m by epsilon submatrix of A having the property that each row of E* contains at least alpha 1's. The epsilon columns of E* are said to form an alpha-set of representatives for A. Let epsilon(alpha) be the minimal number of columns of A that form an alpha-set of representatives. The integer epsilon(alpha) is called the alpha-width of A. If A has alpha-width epsilon(alpha), select an m by epsilon(alpha) submatrix E* of A having the property that the number delta(alpha) of rows of E* containing exactly alpha 1's is as small as possible. The integer delta(alpha) is called the alpha-height of A. (Author)

AD-274 207 Div. 15, 30
(TISTP/TL) OTS price $7.60

California U., Los Angeles.
SYNTHESIS OF SHAPING FILTERS FOR NONSTATIONARY STOCHASTIC PROCESSES AND THEIR USES,
by Edwin Stear. Aug 61, 66p. incl. illus. 34 refs. (Rept. no. 61-50)
(Contract AF 49(638)438)
(AFOSR-2036)
Unclassified report

DESCRIPTORS: (*Statistical processes in Synthesis of *Linear systems, Noise.) (Probability, Statistical functions, Statistical distributions, Matrix algebra, Differential equations, Least squares method, Mathematical prediction.) Theses.

This study considers the problem (usually called the shaping filter problem) of synthesizing linear systems whose responses to white noise input processes and appropriate sets of random initial conditions will be stochastic processes whose covariance functions are prescribed functions of two variables. Exact solutions to the shaping filter problem are presented for certain special cases and some discussion of predictability of the processes is presented. Attention is then focused on the general problem and by means of the Schauder Fixed Point Theorem and by Picard'd method of successive approximations the existence of physically realizable shaping filter is established for a large class or separable covariance functions. The question of the uniqueness of the shaping filter and its relationship to the covariance matrix of the set of random initial conditions is investigated. It is shown that if an appropriate set of random initial conditions is specified, then the weighting function of the shaping filter is unique up to a multiplicative factor of ± 1. The further requirements on the covariance function in order to guarantee that the shaping filter can be characterized by a finite-order, linear differential equation with continuous coefficients are given as well as certain lesser requirements which permit easy analog simulation. (Author)

AD-274 210 Div. 15
(TISTP/TL) OTS price $2.60

Quartermaster Corps, Washington, D. C.
THE SPECIAL MATHEMATICAL DISCIPLINES OF OPERATIONS RESEARCH,
by John K. Sterrett and Herbert Maisel. Nov 61, 24p. 17 refs. (Operational Mathematics Series rept. no. 8)
Unclassified report

DESCRIPTORS: (*Operations research, Mathematical analysis.) (Linear programming, Information theory, Games theory, Statistical analysis, Statistical processes, Numerical methods and procedures, Mathematical logic, Nonlinear systems, Programming, Theory, Algebra.)

Operations Research is an attitude, an approach, a concept. It is a scientific methodology -- analytical, experimental, quantitative -- which, by assessing the over-all implications of various alternative courses of action in a system under

evaluation, provides an improved basis for decision. Its general mode of operation is in fact to attempt to choose a single course of action from a large body of possible actions. It always seeks a best solution or a least costly approach. Thus there is associated with it the terms maximum and minimum and the goal of optimizing. These have obvious mathematical implications. (Author)

AD-274 258 Div. 15, 30
(TISTP/TL) OTS price $3.60

Northwestern Technological Inst., Evanston, Ill.
DUALITY IN SEMI-INFINITE PROGRAMS AND SOME WORKS OF HAAR AND CARATHEODORY,
by A. Charnes, W. W. Cooper, and K. Kortanek.
Mar 62, 30p. 14 refs. (ONR research memo. no. 55)
(Contract Nonr-122810, Proj. NR 047-021; In cooperation with Carnegie Inst. of Tech. Graduate School of Industrial Administration, Contract Nonr-76001, Proj. NR 047-011)
Unclassified report

DESCRIPTORS: (*Topology, *Linear programming, *Algebra, Integrals, *Inequalities, Differential equations, Geometry, Sequences.) *Numerical analysis.

A notion of dual Haar (or semi-infinite) programs is defined which associate minimization of a linear function of finitely many variables over a convex set defined by an infinite (arbitrary cardinal) system of linear inequalities with maximization of a linear function of infinitely many variables subject to a finite system of linear inequalities. Applying the notions of regularization to these systems, the straightforward duality relations between these programs, obtaining (1) an extended dual theorem precisely paralleling that of the finite system case, (2) a general dual theorem for the most general case of (finite) convex programs by expressing them in our (infinite) form, and (3) the study of any (real) semi-infinite program is reduced to that of a Haar program. Dual structure appears to be particularly adapted to probing the borderline between properties which are purely algebraic and those which require topology. New possibilities are offered for numerical analysis and effective solution of problems of optimization over convex sets with an infinite number of extreme points since it substitutes direct algebraic manipulation and minimal topology for differential-geometric requirements or qualifications. (Author)

AD-274 264 Div. 15
(TISTA/TL) OTS price $7.60

Pennsylvania U., Philadelphia.
TRANSFORMATION GROUPS ON HOMOLOGICAL MANIFOLDS.
Interim technical rept. no. 6,
by Jin Chen Su. 1961, 68p. 19 refs.
(Contract DA 36-034-ORD-2970, Proj. TB2-0001)
(OOR rept. no. 2056:9) Unclassified report

DESCRIPTORS: (*Algebraic topology, *Transformations (Mathematics), *Groups (Mathematics).) (Spheres, Polynomials, Sequences, Differential equations.)

Let G be a topological transformation group on a compact Hausdorff space Y and F(G;Y) its fixed point set. The analysis is devoted to the study of the cohomology structure of F(G;Y) in the following three cases: (1) G is the group Z2 of integers modulo 2 and Y has the mod 2 cohomology ring of the real projective n-space. (2) G is the group Zp of integers modulo p, where p is an odd prime number, and Y has the mod P cohomology structure of the lense (2n+1)-space mod p. (3) G is the circle group S' and Y has the integral cohomology ring of the complex projective n-space. For simplicity, we shall call Y a cohomology real projective n-space or a cohomology lense (2n+1)-space mod p or a cohomology complex projective n-space if its cohomology structure is that described in (1) or (2) or (3). (Author)

AD-274 297 Div. 15
(TISTP/TL) OTS price $9.60

Army Signal Research and Development Lab., Fort Monmouth, N. J.
GENERAL FORMULAS AND A POSITIONAL INDEX-ALGORITHM FOR GENERATING ORTHOGONAL CONTRASTS IN MULTIVARIABLE STATISTICAL DESIGNS,
by Erwin Biser. Feb 62, 108p. incl. tables, 8 refs. (ASRDL technical rept. no 2244)
Unclassified report

DESCRIPTORS: (*Statistical distributions, Design.) (Matrix algebra, Mathematical logic, Polynomials, Vector analysis.) (Experimental data, Tables.)

This analyses deals with the development of general formulas and a number-positional algorithm to generate the effect functions (effects and interactions) of the factors in orthogonal multivariable statistical designs. The algorithm and general formulas presented are ideally suited for a computer. The application of the general formula to a 5x4x3x2 orthogonal design is elucidated by charts and tables. The algorithm developed leads to a significant simplification of the usual techniques of analysis of variance. The positional indices serve to establish a biunique correspondence between the elements of a data-matrix and their associated coefficient-multipliers. The factors, their levels, the associated L-matrices of polynomial values, and the elements of the data-matrix are uniquely represented by sets of positionally ordered numerical indices as subscripts and superscripts.

AD-274 305 Div. 15
(TISTP/TL) OTS price $7.60

Electronics Research Lab., U. of Calif., Berkeley.
ON THE STABILITY OF RANDOMLY VARYING SYSTEMS,
by B. H. Bharucha. 5 July 61, 74p. incl. illus. 36 refs. (Scientific rept. no. 7; Series no. 60, Issue no. 381)
(Contract AF 19(604)5466, Proj. 5632)
(AFCRL 62-38) Unclassified report

DESCRIPTORS: (*Stability of Random varying systems, *Probability, Vector analysis, Differential equations, *Statistical processes, Difference equations.) (Inequalities, Matrix algebra.)

This analysis is concerned with the stability of random systems, that is, systems whose internal characteristics are governed by probability laws. Concepts of stability appropriate to random differential systems are formulated and discussed. Precise definitions of stability are stated and theorems interrelating these definitions are proven. Some particular types of stability investigated are, in the mean norm, in the ith moment, in probability, almost sure, and almost uniform-in-omega. Particular attention is focused on the random linear (vector) differential equation with piecewise constant parameters. (Author)

AD-274 315 Div. 15
(TISTP/TL) OTS price $2.60

Institute for Fluid Dynamics and Applied Mathematics, U. of Maryland, College Park.
A THEOREM ON ERROR ESTIMATION FOR FINITE DIFFERENCE ANALOGUES OF THE DIRICHLET PROBLEM FOR ELLIPTIC EQUATIONS,
by J. H. Bramble and B. E. Hubbard. Feb 62, 25p. 19 refs. (Technical note no. BN-281)
(Contract AF 49(638)228, Proj. 17501)
(AFOSR-2371) Unclassified report

DESCRIPTORS: (*Errors, Estimation of a finite difference analogue of *Green's function for Elliptic equations, *Partial differential equations.) (Operators (Mathematics), Real numbers, *Difference equations.)

A general theorem on error estimation is stated which can be used as a guide in the formulation of finite difference analogues of the Dirichlet problem for elliptic equations. As examples of application of this theorem two finite difference analogues are presented and the corresponding discretization errors are shown to be $O(h^2)$ and $O(h^4)$ respectively. Here h is the mesh size. (Author)

AD-274 316 Div. 15
(TISTP/TL) OTS price $2.60

Institute for Fluid Dynamics and Applied Mathematics, U. of Maryland, College Park.
POISSON'S EQUATION AND GENERALIZED AXIALLY SYMMETRIC POTENTIAL THEORY,
by R. P. Gilbert. Mar 62, 19p. 15 refs. (Technical note no. BN-283)
(Contract AF 49(638)228, Proj. 17501)
(AFOSR-2450) Unclassified report

DESCRIPTORS: (*Partial differential equations and *Potential theory.) (Integral equations, Real variables, Operators (Mathematics), Taylor's series, Special functions.)

A method is developed by which one may obtain solutions to the non-homogeneous equation of generalized axially symmetric potential theory (GASPT). Representation formulae are obtained and the method is shown to be extendable under certain symmetry conditions to the Poisson equation in three variables. (Author)

AD-274 339 Div. 15
(TISTP/GRW) OTS price $4.60

Rand Corp., Santa Monica, Calif.
WIDTH SEQUENCES FOR SPECIAL CLASSES OF (0,1)-MATRICES,
by D. R. Fulkerson and H. J. Ryser. Mar 62, 45p. 6 refs. (Memo. no. RM-2898-PR)
(Contract AF 49(638)700, Proj. Rand)
Unclassified report

DESCRIPTORS: (*Matrix algebra, *Combinatorial analysis, Sequences.)

The study of alpha-widths of (0, 1)-matrices (AD-274 181) continued, the emphasis being on those special classes of b by v (0, 1)-matrices having k 1's per row and 4 1's per column. It is assumed throughout that the class parameters b, v, k, r satisfy the inequality (b-r)(v-k-1) less than or equal to v - 1. Such a class has special combinatorial interest. For example, complements of finite projective planes and of Steiner triple systems have parameters satisfying this inequality. Several theorems are proved concerning the width sequence for a matrix in such a class. Insofar as possible, these results are used to obtain information concerning the maximal width sequence for the class. Perhaps the major general result established is that jumps in the width sequence for a matrix in the class, or in the maximal width sequence for the class, are either 1 or 2. (Author)

16. MEDICAL SCIENCES

AD-273 986 Div. 16
(TISTB/AW) OTS price $.50

Aerospace Medical Lab., Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio.
A COLORIMETRIC DETERMINATION FOR 1,1-DIMETHYL-HYDRAZINE IN AIR, BLOOD, AND WATER.
Rept. on Health Hazards of Materials and Radiation,
by Mildred K. Pinkerton and others. Dec 61, 10p. incl. illus. 8 refs.
(Proj. 7165)
(ASD TR 61-708) Unclassified report

DESCRIPTORS: (*Hydrazine derivatives, Body fluids, Blood, Urine, Analysis, Colorimetry.) (Propellants, Toxicity.)

A simple, rapid colorimetric procedure is described for measuring microgram quantities of 1,1-dimethylhydrazine (UDMH) in blood and water. The method, with minor modification, has also been adapted for analysis of air samples. The report provides a calibrated range for analysis of 1-60 micrograms UDMH per milliliter fluid and of 2.5-50 ppm in air; its useful range may be considerably extended by manipulative dilution techniques. The test has additional, limited qualitative application to the analysis of urine. (Author)

AD-274 038 Div. 16
(TISTB/AW) OTS price $3.60.

Armour Research Foundation, Chicago, Ill.
APPLIED RESEARCH CONCERNING ARTIFICIAL PHOTOSYNTHESIS.
Final rept., 1 May 60-30 Sep 61, on Equipment for Life Support in Aerospace,
by J. A. Gross, Milton J. Becker, and A. M. Shefner. Jan 62, 32p. incl. illus. tables, 43 refs. (Rept. no. ARF 3174-17)
(Contract AF 33(616)7255, Proj. 6373)
(MRL TDR 62-5)
Unclassified report

DESCRIPTORS: (*Photosynthesis, Simulation.) (*Chlorophylls, Biochemistry.)

The structure, biochemistry, and photosynthetic function of the spinach chloroplast was investigated to gain sufficient knowledge to permit a similar active system to be synthesized by man. Chloroplasts were isolated and fragmented. Relatively narrow-range size groupings of the fragments were obtained by differential centrifugation. These fractions were assayed physiologically and chemically. Maximal functional activity, in terms of electrons transferred or oxygen evolved under illumination, was found in particles sedimenting between 20,000 g and 50,000 g. Various anion concentrations were tested. An attempt to obtain photoactivity from a dried chloroplast

layer -- a first approximation of an artificial system -- was only partially successful. The studies indicate that activity in the fractions varies, probably reflecting altered structural or chemical composition. Results are discussed in relation to proposed models for the fine structure of the chloroplast and the basic photosynthetic unit. (Author)

AD-274 064 Div. 16
(TISTB/LH) OTS price $5.00

Science and Tech. Div., Library of Congress, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY (FORMERLY: AVIATION MEDICINE) AN ANNOTATED BIBLIOGRAPHY. VOLUME V. 1956 LITERATURE,
by Arnold J. Jacobius, Roman Kenk and others. 1962, 378p.
(Sponsored by U. S. National Aeronautics and Space Administration, U. S. Air Force and U. S. Federal Aviation Agency)
Unclassified report

DESCRIPTORS: (*Bibliography, *Space medicine, *Biology.) (*Physiology, Metabolism, Neurology, Sensory perception, Psychology, Psychiatry, Closed-cycle ecological systems, Astrophysics, Military personnel, Aviation personnel, Pharmacology, Safety, Air sea rescues.)

AD-274 078 Div. 16
(TISTB/AW) OTS price $3.60

St. Louis U., Mo.
REGULATION OF CUTANEOUS CIRCULATION DURING BODY HEATING.
Rept. on Biophysics in Flight,
by Alrick B. Hertzman. Dec 61, 23p. incl. illus. tables, 55 refs.
(Contract AF 33(616)7077, Proj. 7222)
(ASD TR 61-740) Unclassified report

DESCRIPTORS: (*Skin, *Body temperature, Blood circulation, Temperature control, Heat transfer, Heat production (Biology), Sweat cooling, Dehydration.)

This report summarizes current information concerning the regional adjustments of cutaneous vascular tone during body heating. Most of the data to which reference is made were obtained in the writer's laboratory. The importance of the local skin temperature in accounting for the cutaneous vasodilatation is emphasized and the role of bradykinin is discounted. The regional differences in the onset, temporal sequence, and extent of the cutaneous vasodilatation are not explained by reference to a central thermostat in the hypothalamus. (Author)

AD-274 141 Div. 16
(TISTB/LH) OTS price $9.60

Airesearch Mfg. Co., Los Angeles, Calif.
CONTAMINANT FREEZE-OUT STUDY FOR CLOSED RESPIRATORY SYSTEMS.
Final summary rept. for Jan-Aug 61, on Equipment for Life Support in Aerospace,
by C. C. Wright. Feb 62, 102p. incl. illus. tables, 9 refs. (Rept. no. SS-596-R, Rev. 1)
(Contract AF 33(616)7768, Proj. 6373)
(MRL TDR 62-7)
Unclassified report

DESCRIPTORS: (*Respiration, Closed-cycle ecological systems, Oxygen, Metabolism.) (Water vapor, Disposal and Recovery, Carbon dioxide, Adsorption.) (Freeze drying, Dehydration, *Decontamination, Feasibility studies.)

An analytical feasibility study was conducted on contaminant freeze-out (water vapor and carbon dioxide) systems, which employ the endothermic conversion of liquid oxygen to gaseous oxygen as a heat sink. Freeze-out systems, combination freeze-out and adsorption systems, and systems with auxiliary cooling were compared. The simple freeze-out system with water removal (dumped overboard as a vapor to a vacuum) appeared to be best. A desirable feature of this system is that the liquid oxygen requirements are low (about equal to the normal metabolic oxygen consumption rate). A possible undesirable feature is that the frozen out water is not recovered. The system uses a four-channel regenerative switching heat exchanger in which cooling with freeze-out, regeneration of the effluent air, and sublimation of the frozen out contaminants occur simultaneously. (Author)

AD-274 149 Div. 16
(TISTB/LH) OTS price $7.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
STUDY OF THE PURIFICATION OF WATER FROM BIOLOGICAL WASTE.
Final rept., 5 Feb 60-15 Jan 62,
by A. H. Okamoto, and J. J. Konikoff. Jan 62, 67p. incl. illus. tables, refs.
(Contract NASw-127)
Unclassified report

DESCRIPTORS: (*Water, Recovery and Purification from *Metabolic products.) (Closed-cycle ecological systems, Space flight, Space medicine.) (*Urine, Processing, Vaporization.)

Studies concerned a technique for the recovery of potable water from metabolic wastes. The technique begins with the vaporization at a reduced pressure of the volatiles contained in the wastes followed by a high temperature catalytic reaction to destroy the entrained contaminants, and concludes with the condensation and collection of potable water. Chemical, optical and biological tests and examinations were conducted on the recovered product. Testing with animals and a human subject has shown no detrimental effects. Apparatus for space flight, designed on the basis of data accumulated during this program, would weigh approximately six pounds. The sub-system would be desirable for space flights extending for time periods greater than ten days. (Author)

AD-274 338 Div. 16, 8, 25, 20
(TISTP/TL) OTS price $2.60

Rochester U., N. Y.
THE EFFECT OF MICROWAVES ON THE RESPONSE TO IONIZING RADIATION,
by Joe W. Howland, Sol. M. Michaelson and others. Mar 62, 32p. illus. tables, 26 refs.
(Contract AF 30(602)2248, Proj. 5545)
(RADC TDR 62-102) Unclassified report

DESCRIPTORS: (*Radiobiology, Radiation injuries, Laboratory animals, Brains, Blood, Recovery, Survival.) (*Radiation effects of Ultra high frequency, *Microwaves, *Ultraviolet radiation, X rays, Gamma rays, Ionization.) Dose rate.

The interaction of different forms of energy that result in antagonism or modification of response in the organism is a recognized biological phenomenon. Evidence was obtained that dogs exposed to a physiologically tolerated level (100 mw/square cm) of pulsed microwaves (2800 mc) are less sensitive to ionizing radiation than animals not previously pretreated with microwaves. Simultaneous exposure to ionizing and microwave irradiation results in earlier granulocytic recovery than is seen after ionizing radiation alone. Protection by enhancement of recovery processes is considered. Lethality from whole and partial body ionizing radiation after exposure to microwaves is reduced depending on duration of previous microwave exposure. The results indicate the need for additional work with consideration of time-intensity factors of both forms of energy to permit the evaluation of these procedures in modification of injury or enhancement of recovery after ionizing radiation exposure. (Author)

AD-274 397 Div. 16, 2
(TISTP/FR) OTS price $2.60

Intermountain Weather, Inc., Salt Lake City, Utah.
COMPUTATION OF VISUAL RANGE IN FOG AND LOW CLOUDS,
by Don R. Dickson and J. Vern Hales. Dec 61, 21p. incl. illus. tables, 12 refs. (Scientific rept. no. 3)
(Contract AF 19(604)7333, Proj. 8641)
(AFCRL 62-203) Unclassified report

DESCRIPTORS: (*Visual acuity, Visibility, Range, Fog, Clouds, *Illumination.)

Visual ranges were computed for various values of extinction coefficient, for five sets of conditions appropriate to fog and low clouds. The computations involve basic theories of visual range as developed by Allard (1876) and Koschmieder (1924). The four values of the threshold of illumination, which Haig and Morton (1958) determined, were used in the Allard theory computations. (Author)

17. METALLURGY

AD-273 951 Div. 17, 26
(TISTM/BRW) OTS price $7.60

Linde Co., Indianapolis, Ind.
FABRICATION AND PROPERTIES OF TUNGSTEN AND TUNGSTEN ALLOY SINGLE CRYSTALS.
Final rept., 29 June 61-28 Feb 62.
31 Mar 62, 74p. incl. illus. tables, 32 refs.
(Contract NOw 61-0671-c; In cooperation with Haynes Stellite Co.)
Unclassified report

DESCRIPTORS: (Single crystals, *Tungsten, *Tungsten alloys, Preparation, Growth, Processing, Mechanical properties, Physical properties.) (Tungsten, Additives of Niobium, Zirconium, Titanium, Hafnium, Iridium, Tantalum, Tantalum compounds, Carbides, Thorium compounds, Aluminum compounds, Oxides, Potassium compounds, Silicates.) (Surfaces, Grinders, Pickling, Heating, Forging, Rolling mills, Hardness, Crystal structure, Crystallization, Transition temperature, Determination.)

An investigation was made to evaluate the fabricability and properties of W and W alloy single crystals. This was accomplished with 65 crystals prepared with diameters ranging from 1/2 to 1 in. and lengths from 6 to 18 in. Included are several dilute alloys. The majority of crystals were successfully swaged, forged or rolled at temperatures far below those required to fabricate polycrystalline W. The following properties were determined on the fabricated material: hot hardness, recrystallization temperature, mechanical properties at elevated temperatures, and ductile to brittle transition temperature. It is shown that single crystals have a significant fabrication advantage and that their mechanical properties after working are equivalent to material of similar composition prepared by other commercial processes. Surface preparation is important in obtaining good fabrication and low bend ductile-brittle transition temperatures. The single crystals were extensively characterized by chemical analyses and X-ray and metallographic observations. (Author)

AD-273 979 Div. 17, 25
(TISTM/BRW) OTS price $3.60

Illinois Inst. of Tech., Chicago.
A RATIONALIZATION OF THE DATA ON GRAIN BOUNDARY MIGRATION IN ZONE-REFINED METALS,
by Paul Gordon. Mar 62, 23p. illus. 16 refs.
(Technical rept. no. 10)
(Contract Nonr-140603)
Unclassified report

DESCRIPTORS: (*Metals, Zone melting, *Grains (Metallurgy), Growth, Crystal structure, Crystallization, Theory, Mathematical analysis, Equations.)

It is shown that equations for grain-boundary migration given by Gordon and Vandermeer (The Mechanism of Boundary Migration in Recrystallization)--based on the idea first advanced quantitatively by Lucke and Detert (Acta Metallurgica 5:628, 1957)--satisfactorily explain the data on boundary migration obtained with polycrystalline material. Reasons for the apparent lack of agreement between the equations and data from single-boundary migration measurements are discussed. (Author)

AD-274 037 Div. 17
(TISTM/EJH) OTS price $4.60

Armour Research Foundation, Chicago, Ill.
DEVELOPMENT OF A Ti-Al-Cb ALLOY FOR USE AT 1200-1800 F.
Final rept. for 1 May 60-31 July 61, on Metallic Materials,
by Joseph B. McAndrew and Charles R. Simcoe.
Mar 62, 36p. incl. illus. tables (Rept. no. ARF 2201-15)
(Contract AF 33(616)7262, Proj. 7351)
(ASD TR 61-446) Unclassified report

DESCRIPTORS: (*Heat resistant alloys, *Titanium alloys, Niobium alloys, Aluminum alloys, Tin alloys, Hafnium alloys, Zirconium alloys, Sheets, Manufacturing methods, Mechanical properties, Tensile properties, Density, Oxidation, Resistance, High temperature research.) (Melting, Electric arcs, Forging, Rolling mills, Heat treatment.)

Ti-base alloys containing major amounts of Nb and Al are being studied with the object of developing new high-temperature alloys of low density. Results of the second year of this program, derived from the preparation and examination of (1) 35 quaternary alloys containing small additions of Sn, Hf, or Zr; (2) four high-purity ternary alloys; and (3) ten-pound melts of Ti-15Nb-10Al and Ti-17.5Nb-15Al are discussed. In a number of alloys, improved tensile properties and oxidation resistance resulted from the addition of Sn, Hf or Zr, and in some instances very high strength-density ratios were maintained up to 1800 F. The properties of high-purity alloys were similar to those of alloys prepared with sponge Ti. It is recommended that further effort be directed toward the more highly alloyed compositions, including those containing Hf and Zr. (Author)

AD-274 068 Div. 17
(TISTM/BRW) OTS price $9.60

Magna Corp., Anaheim, Calif.
PROCESS SPECIFICATIONS AND TECHNICAL MANUAL FOR THIN METAL FILM CORROSION INDICATORS,
by Lloyd Polentz. 31 Jan 62, 1v. incl. illus. tables.
(Contract AF 33(600)42151)
Unclassified report

DESCRIPTORS: (Corrosive gases, *Detection, *Corrosion, Thin films, Metal films, Specifications, Military requirements.) Vapors, Acids, Humidity, Control systems, Packaging, Storage, Warehouses, Containers.

Specifications and a technical manual are presented for (1) a visual metal film matchbook corrosion indicator, (2) a visual thin metal film plug corrosion indicator, and (3) electrical resistance type corrosion indicating systems for packaging, consisting of a corrosion meter system and a visual alarm system. The matchbook corrosion indicator is a device for visually indicating the presence of a corrosive atmosphere in a sealed unit (chest, package, container, cabinet or housing) or in a relatively closed environment such as a warehouse or storeroom. The visual thin-metal-film plug corrosion indicator is for determining the corrosiveness of the atmosphere contained within a rigid container or a flexible moisture-vapor-proof envelope or bag. The electrical resistance type corrosion indicating systems are for remotely detecting the presence of a corrosive atmosphere within a sealed package containing equipment in storage, or in a relatively closed environment such as a warehouse or storeroom.

AD-274 151 Div. 17, 25
(TISTM/BRW) OTS price $9.10

General Electric Co., Schenectady, N. Y.
LOW-TEMPERATURE BRITTLENESS OF REFRACTORY METALS.
Final rept., Aug 58-Mar 62,
by H. W. Schadler and J. R. Low, Jr. Apr 62, 103p. incl. illus. tables (Rept. no. 62-GC-206)
(Contract Nonr-261400)
Unclassified report

DESCRIPTORS: (Brittle materials, *Refractory materials, *Tungsten, *Single crystals, Growth, Preparation, Purification, Zone melting, Electron bombardment, Thermionic emission.) (Crystal structure, Deformation, Fracture (Mechanics), Tensile properties, Shear stresses, Stresses, Lattices, Plasticity, Plastic flow, Transition temperature, Crystallization.) (*Molybdenum alloys, *Rhenium alloys.) Alloys, Metals, Low temperature research.

Effort was directed towards (1) the production of high-purity material, (2) determination of the modes of deformation and the mechanical properties of W single crystals as a function of temperature, and (3) the behavior of individual dislocations. The W was produced in the form of single crystals and purified by the electron bombardment floating zone refining technique developed by Calverly, Davis, and Lever (J. Sci. Instr. 34:142, 1957). The modes of deformation and mechanical properties were determined at 500 to 20 K with standard techniques and the single crystals. The behavior of individual dislocations was observed with the aid of the etch-pitting technique of Wolff (Acta Metallurgica 6:559, 1958) and the technique of Stein and Low (J. Appl. Phys. 31:362, 1960) for measuring dislocation velocities. Appended are (1) a study of the recrystallization characteristics of cold-worked single crystals, and (2) a brief report on crystallography of twins in Mo-35 at.-% Re single crystal. (Author)

AD-274 204 Div. 17, 26
(TISTM/BRW) OTS price $17.00

Crucible Steel Co. of America, Midland, Pa.
TITANIUM DIRECTIONALITY PROGRAM.
Final technical engineering rept. 7 Jan 59-15 Sep 61,
by A. E. Leach. Jan 62, 31p. illus. tables, 25 refs.
(Contract AF 33(600)37938, Proj. 7-675)
(ASD TR 62-7-675) Unclassified report

DESCRIPTORS: (*Titanium alloys, Aluminum alloys, Molybdenum alloys, Vanadium alloys, *Sheets, Processing, Manufacturing methods, Rolling mills, Heat treatment, Mechanical properties, Tensile properties.)

This manufacturing process development determined techniques for strip processing to minimize high directional mechanical properties in three DOD Ti alloys. Full-scale strip processing production operations starting with 4000 lb Ti-6Al-4V, Ti-4Al-3Mo-1V and Ti-2 1/2Al-16V ingots have shown that the Ti-2 1/2Al-16V alloy is almost ideally suited to strip processing, developing negligible directionality and having excellent rolling and processing characteristics. The production of Ti-2 1/2Al-16V sheet by strip rolling instead of hand sheet processing will result in greater economics in production and better gage, flatness, and surface finish control. While much information was developed on strip processing the Ti-4Al-4V and Ti-4Al-3Mo-1V alloys, final directionality in these 2 alloys was still higher than in hand sheet product. (Author)

AD-274 206 Div. 17, 26
(TISTM/BRW) OTS price $1.60

Climax Molybdenum Co. of Michigan, Detroit.
INVESTIGATION OF MOLYBDENUM- AND TUNGSTEN-BASE

ALLOY SHEET MATERIALS.
Quarterly rept. no. 3, 25 Nov 61-24 Feb 62,
by Gordon D. McArdle, Robert Q. Barr, and M. Semchyshen. 24 Feb 62, 11p. incl. illus. tables.
(Contract NOw 61-0581-d)
Unclassified report

DESCRIPTORS: (Sheets, *Molybdenum alloys, *Tungsten alloys, Niobium alloys, Titanium alloys, Zirconium alloys, Carbon alloys.) (Processing, Melting, Electric arcs, Vacuum furnaces, Casting, Extrusion, Rolling mills, Heat treatment, Crystallization, Grains (Metallurgy), Hardness, Tensile properties, Surface properties.)

Room temperature tensile tests and bend transition temperature determinations were conducted on stress-relieved and recrystallized specimens of several high strength Mo-base and W-base alloy rolled sheets. The 50-mil-thick sheet stock had been rolled in air on a conventional sheet rolling mill. The preparation and rolling of additional sheet bars of the same alloys in the InFab facility is also described. (Author)

AD-274 265 Div. 17, 25
(TISTM/EJH) OTS price $5.60

Illinois Inst. of Tech., Chicago.
THE INFLUENCE OF RECOVERY ON RECRYSTALLIZATION IN ALUMINUM,
by R. A. Vandermeer and Paul Gordon. Mar 62, 35p. illus. 21 refs. (Technical rept. no. 9 on Contract Nonr-140603, and Technical rept. no. 4 on Contract DA 11-022-ORD-1984)
(Contracts Nonr-140603 and DA 11-022-ORD-1984)
Unclassified report

DESCRIPTORS: (*Aluminum alloys, *Copper alloys, *Aluminum, Crystals, Crystallization, Processing, Deformation, Grains (Metallurgy), Growth, Reaction kinetics.) Metals, Alloys.

The kinetics of isothermal recrystallization in dilute, polycrystalline alloys of Cu in zone-refined Al cold rolled 40% at 0 C obey the equation sq. Bt = 1 - exp - X sub V under annealing conditions for which the driving force for recrystallization is essentially constant. The rates of isothermal recrystallization were retarded under special conditions in certain of the alloys. The retarding effect resulted from a decrease in the linear rate of growth of the recrystallized grains as a function of annealing time. Recovery and recrystallization overlap to a large extent in these Al-base alloys. Increasing impurity content favored recovery over recrystallization. Calorimetric measurements on the Al alloy containing 0.0068 at - % Cu revealed 2 distinct patterns of energy release during recovery annealing. (Author)

AD-274 279 Div. 17, 25
(TISTM/EJH) OTS price $.75

Watertown Arsenal Labs., Mass.
CONSIDERATIONS IN THE KINETICS OF PHOSPHORUS AND SULFUR REMOVAL FROM BASIC ELECTRIC-ARC FURNACE STEELS.
Technical rept., on Materials for Army Weapons and Combat Mobility,
by Eugene DeLuca and John Zotos. Mar 62, 26p. incl. illus. tables, 10 refs. (Rept. no. WAL TR 310.9/1)
(DA Proj. 593-32-007)
Unclassified report

DESCRIPTORS: (*Steel 4140, 4330, 4325, 4340, 1040, Metallurgy, Processing, Purification, Melting, Electric arcs, Solutions, Slags, Separation, Phosphorus, Sulphur, Phase studies, Theory.) Tables.

An analysis of metal and slag composition data gathered during the operation of a 6-1/2-ton basic electric-arc furnace is made for the purpose of quantitatively describing the refining processes of dephosphorization and desulfurization. A kinetic model is proposed, and the data is examined in light of the model; agreement with theory is shown. Relations are obtained correlating metal and slag composition with the rate of the refining processes. The results and their ramifications are discussed with reference to the proposed model, actual operating procedure, extrapolation, and optimum processing time. (Author)

AD-274 289 Div. 17, 14
(TISTM/BRW) OTS price $19.75

Republic Aviation Corp., Farmingdale, N. Y.
COMPILATION OF UNPUBLISHED MATERIALS INFORMATION.
Quarterly rept. no. 4, Jan-Mar 62.
31 Mar 62, 1v. incl. illus. tables (Rept. no. RAC 357-4; ARD 767-255)
(Contract AF 33(616)8084)
Unclassified report

DESCRIPTORS: (Alloys, *Aluminum alloys, *Magnesium alloys, *Titanium alloys, *Steel, *Stainless steel, *Nickel alloys.) (Plastics, *Epoxy resins, *Expanded plastics, *Acrylic resins.) (Mechanical properties, Electrical properties, Physical properties, Chemical properties, Data, Tables, Indexes.)

Property data, not previously published, are presented for 21 materials which were tested during the past five years. The following materials are included: (1) Al base alloys (X2020, 5456); (2) Mg base alloys (HK-31, AZ63, FS-1); (3) Ti base alloys (Ti-4Al-4Mn, Ti-5Al-2.5Sn, Ti-6Al-4V); (4) 5Cr-Mo-V steel; (5) 17-7PH, INVAR, AISI302 stainless steel; (6) Ni base alloys (Rene 41, K-Monel, U-700, Electroformed nickel); (7) Plastics (Epoxy foams, epoxy tooling resins, conductive and reflective resins); and (8) Transparent materials (Stretched Plexiglas 55, Plexiglas II).

AD-274 334 Div. 17, 26, 27
(TISTM/BRW) OTS price $12.00

Pratt and Whitney Aircraft, East Hartford, Conn.
RESEARCH AND DEVELOPMENT OF TITANIUM ROCKET MOTOR CASE.
Quarterly interim technical rept. no. 6, 1 Oct-31 Dec 61,
by W. E. Hilfrich and Robert P. Brody. 31 Jan 62, 74p. illus. (Rept. no. PWA-2031)
(Contract DA 19-020-ORD-5230, Proj. TB4-004)
(WAL TR 766.2/1-5) Unclassified report

DESCRIPTORS: (*Rocket cases, *Titanium alloys, Vanadium alloys, Chromium alloys, Aluminum alloys, Manufacturing methods, Forging, Heat treatment, Welding, Electric arcs, Electron beams, Mechanical properties, Microstructure, Aging.) Tensile properties.

On the basis of limited data (notched and sustained notched tensile strengths) on a full scale 40-in.-diam cylinder, a H content of 240 ppm had no detrimental effect at room temperature on low-turned material aged to the 180,000 psi yield strength level. TIG welding by an improved

copper-fixturing technique produces more uniform weld bead geometry, substantially less weld porosity but no significant improvement in tensile ductility or fracture toughness as compared with steel fixturing. The failure stress for TIG-welded material was inversely proportional to the numerical incidence of porosity, regardless of the weld technique. Limited data indicated that electron beam welds are less susceptible than TIG welds to crack initiation and growth at weld porosity. Closed-die press forging of subscale 14-in.-diam and full scale 40-in.-diam domes at 1850 F with the reductions employed and using the present die configuration produced low tensile ductility after aging to the 180,000 psi yield strength level. (Author)

AD-274 371 Div. 17, 26
(TISTM/BRW) OTS price $8.10

Babcock and Wilcox Co., Alliance, Ohio.
INVESTIGATION OF FABRICATION PROCEDURES FOR 16Cr-8Ni-2Mo WROUGHT MATERIALS.
Final summary rept.,
by D. E. Young. 3 Oct 61, 1v. incl. illus. tables, 14 refs. (Rept. no. 541)
(Contract NObs-72054)

Unclassified report

DESCRIPTORS: (*Stainless steel (16Cr-8Ni-2Mo), Chromium alloys, Nickel alloys, Molybdenum alloys, Austenite, Steel tubing, Steam pipes, Forging, Welding, Processing, Pipes.) (Tensile properties, Impact shock, Microstructure, Magnetic properties, Corrosion, Chemical analysis, Aging, Heat treatment.)

A wrought Cr-Ni-Mo austenitic stainless composition previously investigated for use as a welding electrode and designated as Croloy 16-8-2, was developed. It possesses creep and rupture strengths, in the temperature range of 1050 to 1350 F, which are equal to or greater than TP-304 and TP-321, while generally weaker than TP-347 and TP-316 stainless steels. Croloy 16-8-2 possessed a low yield strength at all test temperatures in combination with high ductility to fracture values and normal fracture strength levels. It was determined that 1350 F is the maximum safe long-time service temperature for Croloy 16-8-2, based upon oxidation characteristics. Intergranular corrosion tests show that aging up to 1500 hr at 1200 F did not eliminate intergranular corrosion while 75-hr aging at 1500 F provided intergranular corrosion resistance. No difficulty was experienced during the manufacture of hollow forgings or tubing of excellent quality. (Author)

AD-274 374 Div. 17, 26
(TISTM/BRW) OTS price $3.60

Battelle Memorial Inst., Columbus, Ohio.
DEVELOPMENT OF A DUCTILE TUNGSTEN SHEET ALLOY.
Quarterly progress rept. no. 1, 26 Apr-26 July 61,
by J. L. Ratliff, G. S. Root and others.
26 Aug 61,
30p, incl. illus. tables, 13 refs.
(Contract NOw 61-0677-c)

Unclassified report

DESCRIPTORS: (*Sheets, Refractory materials, Metals, Alloys, *Tungsten alloys, Powder metallurgy, Melting, Electric arcs, Preparation, Sintering, Controlled atmospheres, Hydrogen, Low pressure research, Rolling mills, Heat treatment, Hardness, Microstructure, Transition temperature.) (Powder alloys, Powder metals, Tungsten, Manganese, Iron, Cobalt, Nickel, Ruthenium, Rhodium, Palladium, Rhenium, Osmium, Iridium, Platinum, Particles, Additives, Oxides, Thorium compounds, Zirconium compounds.) Heat resistant alloys.

Binary alloys of W with ThO2, ZrO2, and the Group VII and VIII metals are being evaluated to determine the effects of these additions on lowering the ductile-to-brittle transition temperature of W. Both powder-metallurgy and arc-melting techniques are being used in alloy preparation. A series of arc-melted binary alloys showed minima exist in the hardness curves of most binary systems of W with the Group VII and VIII metals. The greatest softening effects were found in the binary alloys containing 5 at.-% Re and 1 at.-% Os. (Author)

18. MILITARY SCIENCES AND OPERATIONS

No Entries

19. NAVIGATION

No Entries

20. NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

AD-273 950 Div. 20
(TISTP/WH) OTS price $2.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
FERRO- AND ANTIFERROMAGNETISM IN A CUBIC CLUSTER OF SPINS,
by G. F. Dresselhaus. 11 Jan 62, 21p. incl. illus. tables, 7 refs. (Technical rept. no. 254)
(Contract AF 19(604)7400)
(AFESD TDR 62-71) Unclassified report

DESCRIPTORS: (*Ferromagnetism, *Antiferromagnetism, Lattices, Nuclear spins.)

The Heisenberg exchange Hamiltonian has been solved exactly for a cubic array of eight spins (each with spin 1/2). Both energy eigenvalues and thermodynamic functions have been calculated. A Curie and a Neel temperature can be defined and their values determined as a function of the strength of first, second and third neighbor interactions. For some values of the exchange constants, spiral antiferromagnetic states exist. (Author)

AD-273 977 Div. 20
(TISTP/FR) OTS price $6.60

Pfaudler Co., Rochester, N. Y.
LIQUID RADIOACTIVE WASTE DISPOSAL FACILITY.
Final engineering rept., 8 May 61-25 Jan 62,
by W. F. Swanton and M. L. Hyman. Mar 62, 60p. incl. illus. tables (Rept. no. PF 62-5)
(Contract DA 18-108-405-cml-1030, Proj. G761-6006)
Unclassified report

DESCRIPTORS: (Evaporators, Distilling plants, Feed pumps, Storage tanks, Demineralizers.) *Radioactive waste disposal.

A liquid radioactive waste disposal facility was installed at Nuclear Defense Laboratory for extensive tests and evaluation. The facility is being used for concentration of radioactive wastes from the Army nuclear power program and biological and medical research. It employs a Pfaudler Wiped Film Evaporator to effect gross decontamination of the waste and concentration of the waste by a factor of approximately 100. Condensate from the evaporator is further decontaminated by passage through Permutit mixed-bed demineralizers. The facility is a self-contained, transportable, semi-automatic assembly of monitoring, feed, and residue tanks, pumps, control panel, and ancillary equipment mounted on a skid. Results of preliminary evaluation tests using feed spiked with Co-60 to an activity greater than 8.7 x 10 to the -4 microcurie per ml in beta indicate an over-all DF of approximately 10 to the 6th to 7th power. Initial test results did not determine ultimate facility capability because of errors in the vent piping, which have been corrected, and analytical limits imposed by background activity. DF for alpha appears to be about 1000. (Author)

AD-274 001 Div. 20, 2, 25
(TISTP/JW) OTS price $3.60

Air Force Cambridge Research Labs., Bedford, Mass.
BIOASTRONAUTICAL MEASUREMENTS OF IONIZING RADIATIONS IN SPACE: NUCLEAR EMULSION MONITORING REPORT,
by Herman Yagoda. Feb 62, 28p. incl. illus. tables, 14 refs. (GRD Research notes no. 76; AFCRL 62-244)
(Proj. 8600)
Unclassified report

DESCRIPTORS: (*Radiation counters of *Cosmic rays and Cosmic ray bursts.) (Radiobiology, Laboratory animals.) (Protons, *Proton counters.) Space environmental conditions, Balloons, Ionization.

Four instrumented balloons were launched from Bemidji, Minnesota to secure cosmic ray data at high elevations and to study the effects of the radiations on biological systems. Each of the flights carried small units of nuclear emulsion to provide standardization data for other electronic instrumentation and to serve as directional monitors for heavy primary radiation penetrating the brains of the animals. Measurements were made of star production frequencies, proton enders, and heavy primary thindown hits. As a measure of solar proton enhancement, counts were made of the frequency of proton track enders in the emulsion. The ender production was essentially constant on all four flights, in agreement with earlier measurements in Minnesota, indicating the absence of any flare phenomena. It is suggested that the ratio of proton enders to stars may prove a useful parameter for indicating exposure to solar protons at balloon elevations, and small doses of trapped particles in animals flown in space probes and satellites which approach or graze the lower Van Allen belt. (Author)

AD-274 014 Div. 20, 25
(TISTP/JW) OTS price $9.10

Radiation Lab., U. of Michigan, Ann Arbor.
AN INVESTIGATION OF THE ABSORPTION OF ELECTROMAGNETIC RADIATION BY A PLASMA OF SUB-CRITICAL DENSITY.
Final rept.,
by A. Olte, M. L. Barasch and others. Feb 62, 99p. incl. illus. 18 refs. (Rept. no. 4386-2-F)
(Contract AF 19(604)8032, Proj. 7200)
(AFCRL 62-91) Unclassified report

DESCRIPTORS: (Measurement of Absorption of *Electromagnetic waves by *Plasma physics.) (Microwave probes, Diodes.) Coaxial cables.

The design of an experiment is given which employs an inverted coaxial diode geometry to investigate absorption of electromagnetic radiation below and above the plasma frequency. Data obtained when a pure electron stream is introduced into the system are analyzed, but cannot be completely explained. Difficulties encountered in introducing and ionizing a real gas are discussed. The results of an investigation concerning the form of the electron distribution function in such an experimental arrangement are reported. Finally, the process of free-free absorption is discussed, and expressions are given for the absorption coefficient in the presence of ions and neutral atoms or molecules. These are shown to be essentially equivalent to the results of the usual Lorentzian theory. (Author)

AD-274 032 Div. 20
(TISTP/JW) OTS price $2.60

Naval Research Lab., Washington, D. C.
THE THEORY AND OPERATION OF A FIVE-FOOT-DIAMETER BETATRON WITH EXTERNAL INJECTION.
Final rept.,
by D. C. dePackh. 27 Mar 62, 27p. incl. illus. table, 5 refs. (NRL rept. no. 5751)
Unclassified report

DESCRIPTORS: (*Betatrons, Beam power tubes, *Electron beams, Fuel injection, Test equipment.)

A five-foot-diameter experimental betatron with a beam-containing tube approximately one inch in cross-sectional diameter and having alternating air-core quadrupole focusing and an external injection system has been built and successfully tested. The behavior of the injected electrons was in reasonable agreement with theory. (Author)

AD-274 060 Div. 20
(TISTP/WH) OTS price $6.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
THE MICROTRON,
by A. P. Grinberg. 16 Mar 62, 67p. incl. illus. tables. (Trans. no. FTD-TT-62-211 of Uspekhi Fizicheskikh Nauk, 75, no. 3:pp. 421-458, 1961)
Unclassified report

DESCRIPTORS: (*Electron accelerators, Cavity resonators, Electric fields.) USSR.

The microtron is a cycle resonance electron-accelerator having a constant (in time) master magnetic field. Electrons are accelerated by a high-frequency electrical field created in a hollow resonant cavity; a special type of resonance acceleration is used: resonance with a variable multiplicity factor. The operation of the microtron is treated. (Author)

AD-274 066 Div. 20, 25
(TISTP/JW) OTS price $3.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
MEASUREMENT OF FIELD STRENGTH ON RESONATOR BOUNDARIES BY THE PERTURBATION OF RADIATION FIELD,
by Ibrahim Hefni. 8 Feb 62, 30p. incl. illus. 10 refs. (Rept. no. 48 G-1)
(Contract AF 19(604)7400)
(AFESD TDR 62-73) Unclassified report

DESCRIPTORS: (Measurement of Electromagnetic fields in Cavity resonators.) (Electromagnetic waves, Propagation, Perturbation theory.) Klystrons.

A new indirect method for measuring the absolute values of the field strength on the boundaries of microwave resonators is presented. This method is based on the perturbation of the radiation field, which can be induced by changing the surface impedance of the resonator's conducting boundaries. The method is simple as well as accurate for applications where the other indirect methods, based on the perturbation of the mode-field, fail or become laborious and inaccurate. The perturbation formulas used to calculate the tangential field are simple and were readily derived from the classical theory of propagation of electromagnetic waves in media of high (but finite) conductivity. The new method was used to determine the distribution of surface current on the boundaries of a klystron re-entrant resonator. Relevant experimental results are presented. (Author)

AD-274 167 Div. 20, 30, 31
(TISTE/NTM) OTS price $3.60

Naval Radiological Defense Lab., San Francisco, Calif.
DECONTAMINATION OF SHIPS' SURFACES. II. DESIGN AND CONSTRUCTION OF EXPERIMENTAL FACILITIES,
by R. N. Anderson and R. M. Railey. 30 Jan 62, 35p. incl. illus. tables, 21 refs. (Rept. no. NRDL-TR-549)
Unclassified report

DESCRIPTORS: (Radioactive fall-out, Simulation, *Radiological contamination, Seawater, Nuclear weapons, Detonation, Contamination, Ship decks.) (*Ships, Ship plates, *Decontamination, Artificial radioactivity, Laboratories, Test facilities, Test methods, Tests.)

A laboratory study of the fallout from a seawater nuclear detonation and its contamination of ships' surfaces requires special equipment to make the radioactive simulant, to generate and disperse the simulant on painted surfaces, and to decontaminate these surfaces by liquid methods. The simulant is produced by evaporating 30 gal of seawater containing approximately 2 curies of a selected gamma-emitting radionuclide to a final volume of 3 gal. The concentrated solution is fed to a spinning disc generator which produces 200-micron diameter drops at flow rates from 0.06 ml/sec to 2.5 ml/sec. The drops are generated at the top of a polyethylene-lined chamber 36 ft high, and, as they settle at terminal velocity, they are distributed by a rotating cluster of fans to uniformly deposit on plates 8.5 in. sq. The plates are painted with Navy paints, and cover a floor area of 1256 ft2. The contaminated plates are counted, washed, and recounted at the rate of 50/hr in a machine which simulates firehosing and steam cleaning. The effects of solution temperature, spray pressure, spray time and chemical additives in the liquid decontamination methods may thus be evaluated. (Author)

AD-274 214 Div. 20, 8
(TISTP/TL) OTS price $1.60

General Telephone and Electronics Labs., Inc., Palo Alto, Calif.
ELECTRON DIFFUSION IN A MULTIMODE CAVITY,
by A. D. MacDonald. 15 Jan 62, 15p. incl. illus. 3 refs. (Technical note no. 1)
(Contract AF 30(602)2501, Proj. 5561)
(RADC TDR 62-67) Unclassified report

DESCRIPTORS: (*Electrons, Diffusion, Cavity resonators (Multimode).) (Ionization in Microwaves, Electric fields using Air, Nitrogen, Hydrogen.) Integral equations.

An approximate solution of the diffusion equation describing electron diffusion in a multimode rectangular cavity is described. The results indicate that the electron concentration builds up in the spaces between the maxima of ionization. This means that the breakdown electric field is characteristic of a diffusion length approximating that of the lowest diffusion mode. (Author)

AD-274 259 Div. 20
(TISTB/LH) OTS price $6.60

Nuclear Defense Lab., Army Chemical Center, Md.
COLD WEATHER DECONTAMINATION STUDY - McCOY I.
Interim rept.,
by Joseph C. Maloney and John L. Meredith.
Jan 62, 67p. incl. illus. tables, refs.
(Rept. no. NDL-TR-24)
Unclassified report

DESCRIPTORS: (*Arctic regions, *Decontamination, *Radioactive fall-out.) (Military facilities, Contamination, Tracer studies, Simulation, Experimental data, Effectiveness.)

A series of decontamination tests, limited by improper weather conditions, was conducted using techniques of snow plowing, power sweeping, and fire hosing. The decontamination techniques of grading, sweeping, and hosing on applicable cold-weather surfaces are less effective than the same techniques on corresponding temperate-weather surfaces. Mechanized sweeping and vacuum sweeping of packed snow and frozen soil are effective decontamination techniques. Radiation dosage was kept to a minimum by the experimenters and no residual dosage problems were encountered. Normal camp activities were resumed 30 days after the conclusion of the testing period. (Author)

AD-274 320 Div. 20, 30
(TISTP/TL) OTS price $5.60

Massachusetts Inst. of Tech., Cambridge.
NEUTRON DOSIMETRY, SPECTROMETRY, AND NEUTRON ACTIVATION ANALYSIS.
Final rept.,
by Theos J. Thompson, Norman C. Rasmussen, and Daniel Schwartz. Oct 61, 25p. illus. 8 refs.
(Rept. no. MIT-NE 8)
(Contract AF 19(604)3461, Proj. 5620)
(AFCRL 62-1) Unclassified report

DESCRIPTORS: (*Neutron spectroscopy, Neutrons, Energy, Measurement, Analysis.) (Semiconductors, Neutron spectrometers, Sodium compounds, Isotopes, Iodine compounds, Neutron capture of Gamma ray spectroscopy.) (Quartz crystals (Spectrometers), Alpha spectra, Analysis for Boron compounds.) (Identification of Impurities in *Electronics, *Materials.) Research reactors.

A thorough investigation of the leakage spectrum from the MITR (MIT Reactor) has been carried out using the MITR fast chopper. These measurements were made for three different fuel loadings, in the energy range from 0.001 ev to 10 Kev. They were compared with several theoretical models and are in fairly close agreement with the heavy gas model. A semiconductor neutron spectrometer is described that will be used for high energy spectrum measurements. A triple coincidence pair spectrometer designed for high efficiency is described. Calibration results using Na24 are reported. Operation of a six meter bent quartz crystal spectrograph for capture gamma ray measurements is described. (Author)

AD-274 378 Div. 20, 8
(TISTP/FR) OTS price $3.60

California Inst. of Tech., Pasadena.
A TRANSISTORIZED MULTI-CHANNEL GAMMA RAY AND NEUTRON MONITOR WITH LOGARITHMIC SCALE,
by Ivo Tammaru. 1 Mar 62, 21p. illus. 3 refs.
(Contract Nonr-22018)
Unclassified report

DESCRIPTORS: (*Gamma counters, *Neutron counters.) (*Monitors, Preamplifiers, Geiger counters, Trigger circuits, Power supplies.)

The instrument is used to measure fast neutron and gamma radiation levels around the ONR 10-Mev tandem accelerator at the California Institute of Technology. It has 12 channels, two for each of six monitoring stations, recording gamma radiation and neutron flux separately. It is wholly transistorized, and features a single logarithmic ratemeter scale and warning system for each channel. It consists of three chassis installed in the control console, one containing the complete power supply unit, the others containing the ratemeters and warning circuits for the neutron and gamma channels. There are two detector units at each monitoring station housing detector tubes and preamplifiers. (Author)

21. NUCLEAR PROPULSION

AD-274 015 Div. 21, 20, 14, 17
(TISTB/AW) OTS price $12.00

Lockheed Aircraft Corp., Sunnyvale, Calif.
SHIELDING: AN ANNOTATED BIBLIOGRAPHY,
comp. by William L. Hollister. Feb 62, 163p.
(Special bibliography no. SB-62-2; Rept. no. 3-79-62-1)
(Contract AF 04(647)840)
Unclassified report

DESCRIPTORS: (*Bibliography, *Shielding, *Reactor shielding materials.) (Radiation hazards, Moon, Space flight, Manned, Cosmic rays, Solar flares, Nuclear power plants.) (Scattering, Neutrons, Gamma rays.) (Exposure suits, Concrete, Lead, Aluminum, Beryllium, Boron compounds, Iron, Water.)

22. ORDNANCE

AD-273 990 Div. 22
(TISTW/EET) OTS price $1.60

Hayes International Corp., Birmingham, Ala.
STUDY OF TARGET PENETRATION PREDICTION BY HIGH SPEED AND ULTRA HIGH SPEED BALLISTIC IMPACT.
Quarterly rept. no. 2, 1 Oct-31 Dec 61.
Feb 62, 9p.
(Contract AF 08(635)2155, Proj. 9860)
(APGC TDR 62-11) Unclassified report

DESCRIPTORS: (*Hypervelocity projectiles, Ballistics, Velocity, Terminal ballistics, Statistical functions, Complex variables, Digital computers.) *Targets, Cratering, Density, Stresses, Tensile properties, Fracture (Mechanics), Temperature, Hardness, Penetration, Measurement, Mathematical prediction.

Following a general discussion of material properties under impulsive loading some justification is given for using available static and quasi-static material properties for correlation with hypervelocity impact cratering. A preliminary analysis of the correlation between depth of penetration and ten independent variables has been performed on the digital computer. Multiple correlation coefficients indicate a strong dependence of crater depth upon the tensile yield strength of the target relative to other independent variables. About 96% of the variance in crater depth may be explained by variations in the ten independent variables chosen for this first analysis. (Author)

AD-274 026 Div. 22
(TISTW/EET) OTS price $3.00

Ordnance-Technical Intelligence Agency, Arlington, Va.
ENCYCLOPEDIA OF EXPLOSIVES. A COMPILATION OF PRINCIPAL EXPLOSIVES, THEIR CHARACTERISTICS, PROCESSES OF MANUFACTURE, AND USES.
1962, 184p. 45 refs.
Unclassified report

DESCRIPTORS: (Explosives, Propellants, Chemical properties, Chemical reactions, Processing, Manufacturing methods.) *Encyclopedias for *Explosives, Bibliographies, Indexes.

The encyclopedia is intended to serve as a research and reference aid on domestic and foreign explosives, both industrial and military. The main body of the encyclopedia is divided into three sections: glossary, general section, and foreign section. In addition, there is an appendix and a bibliography. The glossary contains primarily those terms which either are unique to explosives or which have a particular specialized meaning when applied to explosives. The general section covers domestic and foreign standard explosives that are currently in use. The foreign section constitutes an index of foreign explosives nomenclature. It is subdivided into British, French, German, Hungarian, Italian, Japanese, Russian, and Spanish terms. (Author)

AD-274 128 Div. 22
(TISTW/RD) OTS price $10.50

Denver Research Inst., Colo.
THE DYNAMICS OF TERMINAL BALLISTICS. BALLISTIC EVALUATION PROCEDURES FOR ARMORED GRILLE DESIGNS.
Final rept.,
by Rodney F. Recht and Thomas W. Ipson. 1 Feb 62, 121p. incl. illus. tables, 9 refs. (Rept. no. DRI 2025)
(Contract DA 23-072-ORD-1302)
Unclassified report

DESCRIPTORS: (*Terminal ballistics, Dynamics of Small arms, Projectiles, Armor piercing ammunition and Fragmentation ammunition.) (Design of Armor, Grilles for Armored vehicles.) Penetration of Projectiles in Steel, Aluminum, Titanium, Armor plate.

The terminal ballistic dynamics of small arms projectiles and fragment simulating projectiles are presented. These dynamics include the post-impact residual velocity and direction of projectiles, projectile break-up and dispersion of projectile fragments, and the mechanics of plate perforation. Ricochet dynamics concerning steel, aluminum, and titanium armor materials have been determined experimentally for impact obliquities up to 60 degrees. Analytical equations which accurately predict the dynamics of ballistic perforation were derived and confirmed by experimental data. These equations consider the effects of obliquity, plate thickness, edge impact and projectile shape. A ballistic evaluation procedure, based upon the defined terminal ballistic dynamics, was developed. While the procedure was developed specifically for the evaluation of grilles, it can be used equally well for evaluating any armoring concept or the performance of projectiles. Several prototype grilles were designed and evaluated. Some of these will be fabricated and ballistically proof-tested. (Author)

AD-274 228 Div. 22
(TISTW/RD) OTS price $9.10

Ballistic Research Labs., Aberdeen Proving Ground, Md.
INFORMATION SUMMARY OF BLAST PATTERNS IN TUNNELS AND CHAMBERS (SECOND EDITION).
Mar 62, 75p. incl. illus. tables (BRL memo. rept. no. 1390)
(DA Proj. no. 503-04-002)
(DASA rept. no. 1273)
Unclassified report

DESCRIPTORS: (Determination of Pressure, *Blast in Tunnels resulting from exterior *Underground structures, *Nuclear explosions.) (Attenuation, Propagation, Reflection of Shock waves in Tunnels.) (Blast, Shielding.) (*Shock tubes for testing, Blast in Tunnels.)

Military requirements for protective construction have in recent years included blast hardened designs. This often means putting the construction deep underground and sets up requirements for information on the behavior of blast waves in confined regions such as tunnels and chambers. The Shock Tube Facility at the Ballistic Research Laboratories (BRL) endeavored to obtain information on the behavior of blast waves in tunnels and chambers by instrumenting models of simple tunnel configurations with piezoelectric gages and subjecting the models to the blast wave from shock tubes. Data were obtained from models attached to the 24 in. circular tube, the 4 x 15 in. rectangular tube, and the high pressure tube. A compilation of the test results are presented. (Author)

AD-274 293 Div. 22, 24, 17
(TISTM/BRW) OTS price $6.60

Aerojet-General Corp., Downey, Calif.
CINEMICROSCOPIC STUDIES OF ELECTRICALLY EXPLODED WIRES AND FILMS.
Final rept.,
by L. Zernow, G. Woffinden and F. Wright.
5 Oct 61, 65p. incl. illus. table, 33 refs.
(Rept. no. 0242-01(08)FP)
(Contract DA 04-495-ORD-1407)
Unclassified report

DESCRIPTORS: (*Wire, Tungsten wire, Thin films, *Detonation, Photographic analysis, *High speed photography, Motion picture cameras, Aluminum, Metal films, *Electric detonators, Electric discharges, Energy.)

It has been shown that as the energy input increases, exploding wires go through an unduloid stage and into a striated mode of explosion. Experiments showed that the striations are the result of the interaction of bubble-like structures which develop on the exploding wire. Impurities such as 3% ThO2 in W wire markedly lowered the energy at which breakup occurs, causing the formation of many small bubbles instead of the larger ones which normally produce the striated mode. Exploding films followed a 2 stage-process. In the first stage, striations perpendicular to the nominal current path develop. If the voltage is below a critical value, the second stage never develops. If the critical voltage is exceeded, a second process of surface discharge is observed. Current-time measurements agree fully with the optical observations, showing a single pulse when the striation process occurs below the critical voltage, and a double pulse when the striation process is followed by the surface discharge. The striations have a polarized dendritic structure under the microscope, and cinemicroscopic observations indicate that the polarized structure of the striations is identical with the structure that develops at an artificial scratch in the film during the discharge. (Author)

AD-274 367 Div. 22
(TISTW/DLW) OTS price $1.10

Army Infantry Board, Fort Benning, Ga.
EVALUATION OF MODIFIED FEED SYSTEM FOR GUN, MACHINE, 7.62MM, M60.
8 June 61, 3p. illus.
(Proj. 2922)
Unclassified report

DESCRIPTORS: (*Automatic weapons, *Small arms, *Feed mechanisms, Effectiveness, Tests.) (Small arms ammunition, Packaging, Containers.)

Tests were conducted to determine the suitability for Army use of a modified feed system on the 7.62mm, M60 machine gun. The modified system is essentially a modified feed plate. It consists of an extension of the feed plate which forms a hook that accepts a modified 100-round bandoleer. Approximately 12,000 rounds were fired from each of four M60 machine guns equipped with the modified systems.

AD-274 389 Div. 22
(TISTW/DLW) OTS price $8.10

General Electric Co., Burlington, Vt.
PROJECT VULCAN RESEARCH AND DEVELOPMENT,
Progress rept. no. 32, 1 Dec 61-31 Jan 62,
by R. H. Barrett. 28 Feb 62, 82p. incl. illus. table (Rept. no. R61APB769-32)
(Contract DA 19-020-ORD-5455)
Unclassified report

DESCRIPTORS: (*Aircraft guns, *Automatic weapons, Cams, Feed mechanisms, Firing mechanisms, Hydraulic systems, Bolts, Design, Boresighting, Tests.)

Contents:
Improved part life
Cycloidal cam configuration
Firing cam
Feeder mechanisms
Boresighting and target study
Gun components
Bolt roller shafts
Front track locks
Hydraulic drive
Bolt body insulation
Range records

23. PERSONNEL AND TRAINING

AD-274 190 Div. 23, 28
(TISTB/AW) OTS price $2.60

Behavioral Sciences Lab., Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio.
SPACECREW TRAINING: A REVIEW OF PROGRESS AND PROSPECTS.
Rept. on Training, Personnel, and Psychological Stress Aspects of Bioastronautics,
by Gordon A. Eckstrand and Marty R. Rockway.
Dec 61, 23p. incl. illus. 16 refs.
(Proj. no. 1710)
(ASD TR 61-721) Unclassified report

DESCRIPTORS: (Space flight, Manned, *Astronautics, Aviation personnel, *Training, Selection, Stress (Psychology).)

Current progress and future prospects in the field of spacecrew training are reviewed. Descriptions of all current astronaut training programs are presented, and a number of general conclusions with reference to such training are drawn, based upon the manned space operations which have been conducted to date. In addition to the actual experience which has been gained in training spacecrew personnel, a review is presented of recently completed and current research which is directly relevant to this problem. Areas in which research should be accelerated are identified. (Author)

24. PHOTOGRAPHY AND OTHER REPRODUCTION PROCESSES

AD-274 145 Div. 24, 18
(TISTA/VGW) OTS price $2.60

Dunlap and Associates, Inc., Santa Monica, Calif.
INVESTIGATION OF ADDITIVE COLOR PHOTOGRAPHY AND PROJECTION FOR MILITARY PHOTO-INTERPRETATION.
III. COMPARISON OF ADDITIVE COLOR AND PANCHROMATIC AERIAL PHOTOGRAPHY,
by Richard P. Winterberg and Joseph W. Wulfeck.
Feb 62, 17p. incl. illus. tables, 2 refs.
(Technical rept. no. 3)
(Contract Nonr-313700; In cooperation with Colorvision, Inc., Glendale, Calif.)
Unclassified report

DESCRIPTORS: *Aerial photography, Simulation, Test methods for Tests of Effectiveness of Colors in *Color photography, Detection, Surface targets, *Photographic intelligence.

An experimental study was conducted to compare the number of targets which could be detected and the size of detail which could be resolved with various projections of additive color and its separate components against a panchromatic system and a simulation of panchromatic film. This study parallels the preceding laboratory study under this contract except that similar targets were photographed from the air using the additive system and comparison film was taken. Considering separate viewing of additive records as a single condition, the separated records provided the highest performance. The minus-blue filtering used with the comparison panchromatic system appears to have reduced its effectiveness considerably under the conditions of the present experiment. (Author)

AD-274 353 Div. 24, 8
(TISTA/LSK) OTS price $2.50

Rauland Corp., Chicago, Ill.
HIGH SPEED SHUTTER SYSTEM.
Rept. on Research on Techniques in Aeromechanics, by William O. Reed. Dec 61, 114p. incl. illus. tables, refs.
(Contract AF 33(616)2095, Proj. 7065)
Unclassified report

DESCRIPTORS: (*High speed cameras having *Image converter tubes, Image intensifiers (Electronics), *Camera shutters, Design.) (Interferometers, Schlieren photography, High speed photography, Gas flow, Aerodynamics.)

A high speed camera system of recording 16 pictures, each exposed to the light from the object being viewed for 3 x 10 to the -7th power 10 to 3 x 10 to the -6th power seconds, was developed. The system is capable of doing this with an overall light gain so that considerably less light need illuminate the object under study than is required by high speed camera systems based on other physical laws. The experimental evidence furnished shows that photographic negatives having densities of 0.5 can be achieved with 1 microsecond exposure and 200 foot-candles illumination incident on the photocathode (150 watt projection lamp at 110 V) with readily available photographic film and camera optics. (Author)

AD-274 388 Div. 24
(TISTA/LSK) OTS price $2.60

Farrand Optical Co., Inc., New York.
PRINTER, PROJECTION, PHOTOGRAPHIC, EN-49,
by Louis D. Tangorra and George Nershi. Mar 62, 25p. incl. illus. (Technical rept. E.R. 426R)
(Contract AF 30(602)2208, Proj. 6258)
(RADC TR 61-241) Unclassified report

DESCRIPTORS: (*Photographic equipment, Photographic enlargers, Film projectors, Printing, Design.) (Aerial photography, Mapping.)

The diapositive printer EN-49 was designed to accomplish all the required functions of several printers into one. The printer accommodates 3 sizes of film format, 2 1/4 x 2 1/4 in. (70 mm film), 4.5 x 4.5 in., and 9.0 x 9.0 in. films. By a system of projection lenses it can produce either exact geometry or constant size diapositive prints from any of the specified formats. The diapositive prints are subsequently mounted, stereoscopically viewed and evaluated by use of a Balplex plotter or similar equipment. A unique feature is the simple and foolproof method to align the principal point of the film format to the projection axis. Heretofore fiducial marks were separately aligned with an individual magnification system for each fiducial mark. This method is eliminated by simultaneously projecting the 4 fiducial marks onto a viewing screen mounted in front of the operator. By operating the control knobs the operator can easily define and position the marks to the crossline reticle inscribed on the viewing screen.

25. PHYSICS

AD-273 960 Div. 25, 6
(TISTB/AW) OTS price $2.60

Hudson Labs., Columbia U., Dobbs Ferry, N. Y.
BIBLIOGRAPHY OF TECHNICAL REPORTS, STATUS REPORTS AND CONTRIBUTIONS, 1951-1960,
by R. A. Frosch. 16 Oct 61, 30p. refs. (Rept. no. CU-115-62)
(Contract Nonr-26684)
Unclassified report

DESCRIPTORS: (*Bibliography, *Underwater sound, *Underwater sound transmission.) (Sound, Acoustics, Sound ranging, Detection, Sound transmission.) (Ocean bottom, Oceanography, Submarine noise.)

AD-273 961 Div. 25, 8, 30
(TISTP/JW) OTS price $2.60

Electrical Engineering Research Lab., U. of Illinois, Urbana.
RESEARCH STUDIES OF HIGH-DENSITY PLASMAS.
Quarterly progress rept. no. 1, 15 Sep-15 Dec 61,
by E. Bialecke, L. Dreyer and others. 15 Dec 61, 17p. incl. illus. (Rept. no. 1)
(Contract DA 36-039-sc-87232)
Unclassified report

DESCRIPTORS: (*Plasma physics, Density, Measurement, Instrumentation, *Microwave probes, Test equipment, Spectrographic cameras.) Microwaves.

The fabrication of the apparatus required for the formation of a high density plasma is in progress. The instrumentation for the investigation of the properties of high density plasmas has been partially tested. For the formation of the high density plasma, a bank of capacitors is discharged through a one turn coil. Measurements of the magnetic field strength, uniformity and variation in time have been made. Testing of microwave equipment is proceeding and indicates that there is greater than 2% ionization in the plasma. Photomultiplier observations of the visible light emitted by the plasma have not yet shown satisfactory agreement between any two photomultiplier tubes. Spectroscopic investigations are also in progress. A laser is under construction for use as a diagnostic tool in very high density plasmas. (Author)

AD-273 963 Div. 25
(TISTM/EJH) OTS price $2.60

National Electrotechnical Inst. (Italy).
PRELIMINARY EXPERIMENTS ON ELECTROLUMINESCENCE OF ZINC SULFIDE.
Rept. on Study of Electron Traps in Dielectrics by Electroluminescence,
by G. Bonfiglioli, P. Brovetto and C. Cortese. 1962, 15p. illus. (Technical note no. 4)
(Contract AF 61(052)328)
(AFOSR-1835) Unclassified report

DESCRIPTORS: (*Phosphors, *Zinc compounds, *Sulfides, Powders, *Luminescent materials, *Luminescence, *Photoemission, Excitation, Voltage, Solid state physics, Theory.) Dielectrics.

A short review of the literature on electroluminescence (EL) is given. The analysis is limited to phosphors of (activated) ZnS type and to intrinsic EL, i.e., EL excited in condenser type cells, filled with powder phosphors embedded in a good dielectric medium. A new technique, suggested for studying the behaviour of the EL, consists of applying to the cells single transients of voltage (respectively rising or falling) with a constant rate of variation vs time. The circuits used for this technique are described, as well as the preliminary results obtained with commercial EL cells. These results are of a good quantitative character. (Author)

AD-273 969 Div. 25
(TISTP/WH) OTS price $4.60

General Telephone and Electronics Labs., Inc., Bayside, N. Y.
RESEARCH IN TRACE EMISSION SPECTROSCOPY.
Final rept., 1 Feb 61-1 Feb 62,
by Richard L. Rupp. 28 Feb 62, 43p. incl. illus. table, 8 refs. (Rept. no. TR62-706.4)
(Contract AF 19(604)8013, Proj. 4608)
(AFCRL 62-130) Unclassified report

DESCRIPTORS: (*Spectrographic analysis of *Chemical impurities in *Semiconductors.) (Semiconductors, Arsenides, Gallium compounds, Electrical properties, Crystallization.) (Production of Semiconductors.) Vaporization.

Information obtained from this research has (a) resulted in a reliable analytical method for the determination of trace impurities in gallium arsenide, (b) extended the understanding of the influence of matrix volatility so that techniques can be varied to suit the matrix volatilization behavior, (c) clarified the problem of the preparation of representative standards, and (d) by the combination of emission spectroscopy, mass spectroscopy and wet chemical analyses pointed the way to maximum effectiveness in the solution of ultratrace analytical problems. (Author)

AD-273 970 Div. 25
(TISTP/JW) OTS price $3.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
SURFACE CRACKING CAUSED BY ELECTROMAGNETIC WAVE ABSORPTION.
Rept. for Mar 61-Feb 62,
by R. C. Good, Jr. Feb 62, 20p. illus. 14 refs.
(Contract AF 49(638)1030, Proj. 9782)
(AFOSR-2295) Unclassified report

DESCRIPTORS: (Crazing of Glass by Electromagnetic waves and *Thermal radiation from Exploding wires.) (Explosions, Wire.) (*Thermal stresses, Heat.) *Radiation effects.

An Exploding Wire Facility has been used to irradiate glass disks to determine any damaging effects. At power levels of 10 to the 7th power watts deposited in the wire, the glass surface became crazed. Photo-micrographs and profilometer measurements of the surface are presented to support the following conjectures as to the cause of cracking: the energy radiated by the hot wire is absorbed by a thin surface layer of the glass, the temperature rises creating thermal stresses, flaws below the glass surface form stress raisers according to the Griffith crack theory, and the cracks propagate to the surface. The theoretical derivation of the adapted thermoelastic stress theory predicts the dimensions of the cracks and the power levels required if the absorption coefficient is at least 10 to the 3rd power reciprocal centimeters. (Author)

Division 25 - PHYSICS

AD-273 972 Div. 25, 15, 12
(TISTP/TL) OTS price $5.60

Geophysics Corp. of America, Bedford, Mass.
THE PENETRATING POWER OF PARTICULATE MATTER IN AN EXPONENTIAL ATMOSPHERE,
by H. K. Brown, J. Pressman, and F. F. Marmo.
Feb 62, 57p. incl. illus. (Scientific rept. no. 3; GCA Technical rept. no. 62-3-A)
(Contract AF 19(628)231, Proj. 5842)
(AFCRL 62-267) Unclassified report

DESCRIPTORS: (*Guided missiles, Exhaust gases or *Condensation trails of *Light and *Luminescence with respect to Velocity and Distance of *Particles Ejected in *Upper atmosphere.) (Aerodynamics, *Drag, Gravity, Differential equations, Integration, Tables.)

The liht emitted from missile trails represents an exceedingly complex phenomenon. A large variety of physical theories have been offered to explain this luminosity. Since particulate matter is generally found to some dgree in missile exhausts an understanding of the interaction of particulate matter with the atmosphere may provide a key to the disentanglement of the particulate matter contribution. To provide a means for checking the particulate matter hypothesis, this study has been made. It attempts to systematically obtain the mathematical formulae for the velocity and distance behavior of particles of different mass and initial velocity ejected at various heights in an exponential atmosphere. If particulate matter is released in the upper atmosphere, at a point, with a common initial speed in all directions, the drag resistance of the atmosphere will slow down the particles in such a manner that the space loci of the advancing particles, with a common varying speed, will describe successively expanding aspherical surfaces. That is to say, the surfaces of constant speed will be strongly dependent upon the varying density, of the upper atmosphere, which is essentially exponential. (Author)

AD-273 973 Div. 25
(TISTP/JW) OTS price $2.60

Geophysics Corp. of America, Bedford, Mass.
STEADYSTATE ELECTRON DENSITIES FOR IRRADIATED PLASMAS.
Quarterly technical note,
by J. I. F. King and R. Sillars. Mar 62, 25p. incl. illus. 2 refs. (GCA Technical rept. no. 62-8-A)
(Contract AF 30(602)2380, Proj. 5561)
(RADC TDR 62-106) Unclassified report

DESCRIPTORS: (Electrons, Density in *Plasma physics.) (Electrons, Ions, Dissociation, Recombination reactions.) *Electromagnetic waves, Diffusion.

Steadystate electron density profiles were calculated for diffusion- and recombination-controlled plasmas irradiated by an external source of electromagnetic flux. In the former case the internal electron generation caused by progressive beam absorption is balanced by electron diffusion across the plasma boundaries. In the second model the beam-stimulated electron growth is limited by recombination. The efficiency of electron diffusion and consequent wall recombination as a heat transfer process is calculated and found never to exceed 30%. Furthermore, the nonlinear diffusion model gives rise to a stability criterion below which no steadystate electron configuration is possible. (Author)

AD-273 975 Div. 25
(TISTP/JW) OTS price $4.60

Purdue Research Foundation, Lafayette, Ind.
SEMICONDUCTOR RESEARCH.
Quarterly rept. no. 5, 1 Oct-31 Dec 61.
31 Dec 61, 28p. illus. (Rept. no. PRF 2641)
(Contract DA 36-039-sc-87394)
Unclassified report

DESCRIPTORS: (*Semiconductors, Electrical properties, *Optics.) (Magnetic properties, Infrared radiation, Absorption.) (Parametric resonance, Silicon.) (Germanium, Thermal conductivity, Materials.)

Contents:
Electrical and optical properties
- IR measurements of hot carrier temperature in p-Ge
- Galvanomagnetic properties of n-GaP
- IR absorption in GaSb
- Recombination radiation in gallium Antimonide
- Magnetoresistance in n-type germanium in the impurity conduction range
- Cyclotron resonance - 5mm Apparatus

Irradiation effects
- Electron paramagnetic resonance-silicon
- Electron paramagnetic resonance-germanium
- Optical behaviour of irradiated silicon

Low temperature studies
- Specific heat measurements of indium with small percentages of impurity
- Piezo-thermal conductivity in Germanium
- Germanium resistance thermometers

General
- Shallow acceptor states in Germanium
- Growth of zinc telluride single crystals from the vapour phase
- Material preparation

AD-273 981 Div. 25
(TISTM/EJH) OTS price $3.60

Raytheon Co., Waltham, Mass.
ELECTRON PARAMAGNETIC RESONANCE OF TRIVALENT GADOLINIUM IONS IN STRONTIUM AND BARIUM TITANATES.
Scientific rept. no. 3 on Investigation of the Microwave Properties of Ferroelectrics,
by L. Rimai and G. A. deMars. Jan 62, 20p. illus. table, 33 refs. (Rept. no. S-387)
(Contract AF 19(604)8005, Proj. 4600)
(AFCRL 62-56) Unclassified report

DESCRIPTORS: (*Ferroelectric materials, *Ferroelectric crystals, *Strontium compounds, *Barium compounds, *Titanates, Impurities of Rare earth elements such as Gadolinium, Ions, Microwave spectroscopy, Paramagnetic resonance, Nuclear spins, Temperature, Phase transitions, Spectrographic analysis, Refractive properties.)

Electron paramagnetic resonance data of substitutional Gd(+3) impurities in the cubic and tetragonal phases of barium and strontium titanates are reported. The pertinent spin Hamiltonian parameters are determined as a function of temperature in these two phases of both crystals. The temperature for the cubic to tetragonal phase transition in $SrTiO_3$ was determined to be (110 ± 2.5 K). This result was checked by the observation of the temperature dependence of the birefringence pattern of pure (undoped) crystals. In the $SrTiO_3$ crystal a smooth transition was observed, contrary to the case in $BaTiO_3$. The Gd(+3) resonance results are compared with previous data on EPR of iron group impurities. (Author)

AD-273 988 Div. 25
(TISTP/JW) OTS price $14.00

Antenna Lab., Calif. Inst. of Tech., Pasadena.
ELECTROMAGNETIC SURFACE-WAVE PROPAGATION ALONG A DIELECTRIC CYLINDER OF ELLIPTICAL CROSS SECTION,
by Cavour W. H. Yeh. Jan 62, 202p. incl. illus. 63 refs. (Technical rept. no. 27)
(Contract AF 18(600)1113)
(AFOSR-1991) Unclassified report

DESCRIPTORS: (*Electromagnetic waves, Propagation, Waveguides, *Dielectrics.) (Frequency multipliers, Scattering, Boundary layers, Periodic variations, Functions, Cylindrical bodies.)

The problem of electromagnetic wave propagation along a dielectric rod of elliptical cross section is considered. The field components and the dispersion relations of the principal modes are obtained. The principal modes degenerate to modes of the circular dielectric rod as the eccentricity of the elliptical rod approaches zero. It is found that there are two non-degenerate principal modes which possess no cut off frequencies. The boundary conditions for the elliptical rod cannot be satisfied by using a single product term consisting of a radial and a periodic Mathieu function of a specific order to describe the field components in the regions inside and outside the rod. It is believed that an infinite series of such product terms must be used to describe the field components in both regions. It is shown that the boundary conditions may be fulfilled if the field components in one of the two regions are represented by a single product term consisting of a radial and a periodic Mathieu function of a specific order. The field components in the other region are then represented by an infinite series of such product terms, and the problem is simplified to permit analysis. The propagation characteristics of the dominant principal modes are given theoretically and experimentally. (Author)

AD-273 992 Div. 25
(TISTP/WH) OTS price $2.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
DIFFERENCE SCHEME FOR AXISYMMETRIC IMPACT PROBLEM. Quarterly progress rept. no. 4, 3 Nov 61-3 Feb 62,
by T. D. Riney. Mar 62, 24p. incl. illus. tables, 10 refs.
(Contract AF 08(635)1713, Proj. 9860)
(APGC TDR 62-19) Unclassified report

DESCRIPTORS: (*Hypervelocity projectiles, *Impact shock, Plastic flow, Viscosity, Deformation, Hydrodynamics.)

A numerical scheme, successfully employed for two-dimensional hydrodynamics, is extended to the axisymmetric visco-plastic equations governing the hypervelocity impact phenomenon. Computing procedures are outlined which are complete enough for interior regions of the medium. The formulation must be further developed, however, to allow for such contingencies as free boundaries, interior empty cells and the axis of symmetry before a computing code can be written for the impact problem. (Author)

AD-273 994 Div. 25
(TISTP/WH) OTS price $1.60

Air Force Cambridge Research Labs., Bedford, Mass.
ON THE MUTUAL COHERENCE FUNCTION IN AN INHOMOGENEOUS MEDIUM,
by G. B. Parrent, Jr., R. A. Shore, and T. J. Skinner. Feb 62, 15p. incl. illus. 4 refs.
(AFCRL 62-45)
(Proj. 4600)
Unclassified report

DESCRIPTORS: (Light, *Monochromatic light, Optics, Refraction, Theory.) (Vector analysis, Integral equations.)

This analysis is concerned with determining the mutual coherence function of the field produced by a plane quasi-monochromatic source in a region of variable refractive index. A scalar theory is used throughout. A brief review of the conceptual background of coherence theory is presented in Section 1. Section 2 contains an outline of the mathematical formalism of coherence theory and shows that in a region of variable refractive index the mutual coherence function is propagated according to a pair of inhomogeneous scalar wave equations. In Section 3 the pair of wave equations are solved with appropriate Green's functions. An expression is derived for the mutual coherence function of a field produced by a plane quasi-monochromatic source. In Section 4 the case of a statistically homogeneous medium is treated and an expression for the ensemble average of the mutual coherence function is obtained in terms of integrals of the two-point correlation function characterizing the medium. (Author)

AD-273 995 Div. 25
(TISTP/JW) OTS price $7.60

California U., La Jolla.
IMAGES OF THE FERMI SURFACE IN PHONON AND SPIN-WAVE SPECTRA,
by E. J. Woll, Jr. 1961, 69p. incl. illus. 24 refs. (Technical rept. no. 9)
(Contract Nonr-221611, Proj. NR 017-630)
Unclassified report

DESCRIPTORS: (*Phonons, Electrons, Metals, Ions, Conductivity, Lead, Sodium, *Rare earths, *Spectrographic analysis.)

Calculations are carried out to determine whether images of the electronic Fermi surface might be observable in phonon and spin-wave spectra of metals. Semi-quantitative estimates are made of the magnitude of image effects in phonon dispersion curves and phonon lifetimes in typical metals, as well as in spin-wave dispersion curves in rare-earth metals. These estimates lead to the conclusion that Fermi surface images may be experimentally observable in favorable circumstances. (Author)

AD-274 000 Div. 25
(TISTP/JW) OTS price $1.60

Hebrew U. (Israel).
PARAMAGNETIC RESONANCE SPECTRA OF RARE EARTH IONS IN THE CRYSTAL FIELD OF CALCIUM FLUORIDE,
by W. Low. Jan 62, 8p. incl. illus. table, 10 refs. (Technical note no. 18)
(Contract AF 61(052)59)
(AFOSR-2167) Unclassified report

Presented at the International Conference on Magnetism and Crystallography, Kyoto, Japan, in September, 1961.

DESCRIPTORS: (*Paramagnetic resonance, Ions, Rare earths, Crystals, Calcium compounds, Fluorides, *Spectrographic analysis.)

Paramagnetic resonance data of various rare earth ions in the crystal field of calcium fluoride are presented. It is found that there are at least three types of symmetries, cubic, axial, and trigonal. Some spectra of Cerium (3+), Ytterbium (3+), Erbium (3+), and Neodymium (3+) are presented. (Author)

AD-274 007 Div. 25
(TISTP/JW) OTS price $3.60

National Electrotechnical Inst. (Italy).
APPARATUS FOR THERMOLUMINESCENCE.
Summary rept. Part A, on Study of Electronic Traps in Dielectrics by Thermoluminescence,
by G. Bonfiglioli, P. Brovetto, and C. Cortese.
Dec 61, 21p. illus.
(Contract AF 61(052)328)
(AFOSR-2321, pt. A) Unclassified report

DESCRIPTORS: (*Dielectric properties, Electronics.) (*Luminescence, Thermal diffusion, Glow discharges, Light transmission.) (Spectrographic cameras, Test equipment.)

A detailed description is given of an apparatus for thermoluminescence (above room temperature i.e. up to about 350 C), having the following peculiar features: the linear rate of warming is obtained through a cam-actuated Variac transformer; the light detection makes use of phase rectification; the apparatus is provided with a special furnace for recording glow current curves. The possibility of rendering flat the spectral response of the photomultiplier between 2000 and 6000 A through a composite filter is investigated and the method of calculating such a filter is developed. The performances of the apparatus were satisfactory. (Author)

AD-274 013 Div. 25, 8
(TISTP/JW) OTS price $11.50

Radiation Lab., U. of Michigan, Ann Arbor.
WAVE PROPAGATION IN AN ANISOTROPIC COLUMN WITH RING SOURCE EXCITATION.
Doctoral thesis,
by Surendra Nath Samaddar. Dec 61, 149p. incl. illus. 19 refs. (Rept. no. 4386-1-T)
(Contracts AF 19(604)7428 and AF 19(604)8032)
Unclassified report

DESCRIPTORS: (*Electromagnetic waves, Propagation, Waveguides, Magnetic fields, Electric currents.) (*Partial differential equations, *Green's function.) (Plasma physics, Mathematical analysis, Theses.)

Propagation of electromagnetic waves through a homogeneous anisotropic column of a medium of infinite length is considered. This anisotropic column is surrounded by a coaxial homogeneous isotropic medium enclosed by a perfectly conducting metallic circular cylindrical waveguide. A magnetic current ring source is inserted symmetrically in the isotropic medium. Throughout the analysis the strength of the source is considered to be an arbitrary function of the polar angle. For this general problem the complete expressions for fields (due to the source), power flow, and the dispersion relation have been studied. To solve a source problem, dyadic Green's functions for both point electric current source and point magnetic current source have been constructed in a formal way from the source free solutions of the appropriate Maxwell's equations. These dyadic Green's functions can be used for any arbitrary source. (Author)

AD-274 045 Div. 25
(TISTP/JW) OTS price $1.60

Columbia U., New York.
TWO SOLUTIONS FOR THE NONLINEAR ELASTIC THICK WALLED CYLINDER UNDER PRESSURE,
by W. R. Spillers. Feb 62, 8p. illus. 6 refs. (Technical rept. no. 11; Rept. no. CU-11-61-ONR 266(78)CE)
(Contract Nonr-26678, Proj. NR 064-446)
Unclassified report

DESCRIPTORS: (*Cylindrical bodies, Thickness, *Elastic shells, Stresses, Pressure.) (*Perturbation theory, *Nonlinear systems, Reliability.)

Two methods of solution are applied to the problem of the response of a thick walled cylinder with nonhomogeneous strain-dependent and thus non-linear elastic properties: one method is an application of perturbation theory; the other, an iterative numerical scheme using finite difference approximations. The effects of nonlinearity and the region of validity of the solutions are discussed. (Author)

AD-274 046 Div. 25
(TISTP/JW) OTS price $3.60

Columbia U., New York.
STRESSES IN A LINEAR INCOMPRESSIBLE VISCO-ELASTIC CYLINDER WITH ANNIHILATING INNER SURFACE,
by M. Shinozuka. Mar 62, 30p. incl. illus. table (Technical rept. no. 12; Rept. no. CU-12-62-ONR 266(78)CE)
(Contract Nonr-26678, Proj. Nonr 064-446)
Unclassified report

DESCRIPTORS: (*Stresses, Surfaces, *Cylindrical bodies, Pressure, Viscosity, Elastic shells.) (Digital computers, Computer logic.)

A method is developed to find the stresses and strains in an incompressible visco-elastic hollow cylinder with annihilating inner radius contained by an elastic case and subject to internal pressure under the assumption of a state of plane strain. Stresses and strains are computed for a material with deviatoric stress-strain relations characteristic of a standard solid. The numerical computation is carried out with the aid of an IBM digital computer 1620 and is intended to illustrate the effects of the thickness of the cylinder, of the rate of increase of the internal pressure and of the strength of the reinforcement provided by the elastic shell. (Author)

AD-274 055 Div. 25
(TISTP/TL) OTS price $8.60

Oslo U. (Norway).
THE BOLTZMANN EQUATION AND NON-EQUILIBRIUM PHENOMENA IN IONIZED GASES IN ELECTROMAGNETIC FIELDS,
by Jorgen Bernhoft Knoff, tr. by Hallvard Rosseland. 1961, 93p. 23 refs. (Scientific rept. no. 14(36)
(Contract AF 61(052)186)
(AFCRL 62-281) Unclassified report

DESCRIPTORS: (*Quantum mechanics, Ions and *Gas ionization in *Electromagnetic fields.) (Transport properties, Relaxation time, *Quantum statistics, Irreversible processes, Tensor analysis, Magnetic fields.)

The non-equilibrium states(relaxation and transport) of ionized gases in electromagnetic fields are described from a very general basis (Liouville's equation).

AD-274 067 Div. 25
(TISTP/JW) OTS price $8.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
SCATTERING FROM A HOMOGENEOUS PLASMA CYLINDER OF INFINITE LENGTH,
by C. M. de Ridder and L. G. Peterson.
15 Jan 62, 1v. incl. illus. (Rept. no. 312 G-4)
(Contract AF 19(604)7400)
(AFESD TDR 62-70) Unclassified report

DESCRIPTORS: (Electromagnetic waves, *Scattering, Dielectric properties, Cylindrical bodies.) (Wave transmission, Reflection, *Plasma physics, *Electromagnetic waves, Propagation.) Differential equations, Tables.

Scattering of electromagnetic waves from an infinite cylinder of uniform but complex dielectric constant is discussed. The purpose is to make available a set of curves showing the dependence of transmission and reflection coefficients and their phases on plasma frequency and cylinder radius. Two different collision frequencies are used. All quantities have been normalized to eliminate the dependence on the operating frequency and the distance between the transmitting and receiving horns. The incident wave is assumed to be a plane wave traveling in a direction normal to the cylinder axis. Both the transverse magnetic case and the transverse electric case are considered. (Author)

AD-274 072 Div. 25, 14
(TISTM/GEC) OTS price $8.10

Lincoln Lab., Mass. Inst. of Tech., Lexington.
DIVISION 8. SOLID STATE RESEARCH. NO. 4, 1961.
14 Mar 62, 70p. incl. illus. tables, refs.
(Contract AF 19(604)7400)
Unclassified report

DESCRIPTORS: (*Solid state physics, *Intermetallic compounds, Alloys, Crystals, *Single crystals, *Superconductors, *Magnetic materials, Films, Thin films, *Semiconductors, Transistors, *Luminescent materials, Image converter tubes, Infrared image tubes, Microwave equipment, Electronic equipment.) (Electrical properties, Resistance, Magnetic effects, Magnetic properties, Paramagnetic resonance, Surface properties, Photoconductivity, Mass spectroscopy, Polarographic analysis, Optics, Microwaves, Antiferromagnetism, Phonons, Nuclear spins.)

Contents:
Solid state device design
Chemistry
Materials research
Band structure of solids
Microwave and magnetic properties of solids
Transition-metal compounds
Magnetic films
Semiconductor components
Optics and IR

AD-274 073 Div. 25, 10
(TISTM/EJH) OTS price $1.60

Institute for Molecular Physics, U. of Maryland, College Park.
POTENTIAL CURVES AND ROTATIONAL PERTURBATIONS OF CN,
by Robert J. Fallon, Joseph T. Vanderslice, and Robert D. Cloney. 3 Apr 62, 11p. incl. illus. tables, 13 refs. (Technical rept. no. 6)
(Contract Nonr-59514, Proj. NR 051-425)
Unclassified report

DESCRIPTORS: (*Flames, Combustion, Gases, Air, Hydrocarbons, *Cyano radicals, Spectrographic analysis, Molecular spectroscopy, Excitation, Atomic energy levels, Quantum mechanics, Electron transitions.) Shock waves, Solar atmosphere, Stars.

Potential energy curves for electronic states of CN were calculated from experimental data by the Rydberg-Klein-Rees method. The resulting curves were used to discuss qualitatively the rotational perturbations in the v equals 7 vibrational level of one electronic state. (Author)

AD-274 075 Div. 25, 12
(TISTP/JW) OTS price $2.60

Antenna Lab., Ohio State U. Research Foundation, Columbus.
A PROPOSED SCATTERING RANGE FOR SIMULATED ECHO AREA MEASUREMENTS OF PLASMA-COATED OBJECTS,
by T. A. Brackey, L. Peters, Jr. and others.
27 Jan 62, 14p. incl. illus. table (Rept. no. 1116-17; Scientific rept. no. 10)
(Contract AF 19(604)7270)
(AFCRL 62-144) Unclassified report

DESCRIPTORS: (Simulation of *Radar echo areas.) (Electromagnetic waves, Propagation, Scattering.) (*Plasma physics, Dielectrics, Coatings, Titanium compounds.) Satellite vehicles.

A scattering range is proposed for use in experimentally simulating echo area measurements of dielectric bodies and dielectric-coated bodies with dielectric constant less than one. These investigations were initiated due to interest in plasma coatings of satellites in the ionosphere. The optimum parameters of the scattering range and the liquid to be used as the ambient medium are discussed. While no conventional dielectric has the required properties, a mixture of Rutile (42% by volume) in transil oil was found to have the required properties for use as the ambient medium. Settling problems can be greatly alleviated with little change in electrical properties by adding petrolatum to the mixture. (Author)

AD-274 083 Div. 25, 15
(TISTP/TL) OTS price $2.60

Electrical Engineering Research Lab., U. of Illinois, Urbana.
SOLUTION OF MAXWELL'S EQUATIONS IN A MAGNETO-IONIC MEDIUM WITH SOURCES,
by R. Mittra. 18 Jan 62, 24p. incl. illus. 4 refs. (Scientific rept. no. 4)
(Contract AF 19(604)5565, Proj. 8653)
(AFCRL 62-247) Unclassified report

DESCRIPTORS: (Partial differential equations in Ionic current, Dipole moments.) (Integral equations, Numerical analysis, Trigonometry, Functions.) (Integral transforms, Matrix algebra, Tensor analysis, Dielectric properties for Electric currents (Sources).) (*Electromagnetic waves, *Propagation in *Plasma physics in Magnetic fields.) Operators (Mathematics).)

Solutions of Maxwell's Equations with source terms is of considerable importance for many

applications. A complete solution of the field equations is derived in a form which is suitable for the calculation of the fields of arbitrary distances from the source. For an infinitesimal dipole, the very near fields are found in a closed form involving trigonometric functions. The remainder of the solution is expressed in terms of a finite range integral, the integrand of which is finite everywhere. Hence, the solution is very suitable for numerical calculations. (Author)

AD-274 093 Div. 25
(TISTP/TL) OTS price $2.60

Arizona U., Tucson.
LOW FLUX SIMULATION.
Final rept.,
by Ralph W. G. Wyckoff and D. C. Miller. Jan 62, 26p. incl. illus. tables, 2 refs.
(Contract AF 29(601)4604; In cooperation with Philips Electronic Instruments, Mount Vernon, N. Y.)
(AFSWC-TDR-62-8) Unclassified report

DESCRIPTORS: (*Feasibility studies of *X rays, *Electron tubes, X-ray generators, *X-ray photography, Measurement, *Simulation, Voltage.) Tables.

Experiments were made to determine the feasibility of constructing a pulsed source of soft X-rays of flux levels of at least 1 cal/sq cm in submicrosecond times with photon energies between 1 and 5 Kev. The design and operation of the X-ray tube are presented for a circular capacitance bank of series-parallel units having a total capacity of 54 microfarad with maximum voltage rating of 4 Kv, and for another capacitance bank of 6.4 microfarad with a maximum voltage rating of 13 Kv. Anode pulsing was carried out, since the X-ray yield with pulsed cathode was found to be invariably inferior. Semiquantitative measures of the dependence of X-ray intensity on voltage have been made by finding areas of equal blackening in different photographs. Opinions are further developed on the possibility of producing a pulsed soft X-ray flux of the order of 1 cal/sq cm. (Author)

AD-274 099 Div. 25, 17, 14, 4, 30
(TISTM/EJH) OTS price $2.60

Callery Chemical Co., Pa.
DETERMINATION AND ANALYSIS OF THE POTENTIALITIES OF THERMAL ENERGY STORAGE MATERIALS.
Quarterly rept. no. 3, 1 Jan-31 Mar 62,
by K. W. Beahm, C. F. Boynton and others.
31 Mar 62, 21p. incl. illus. tables.
(Contract AF 33(616)7224)
Unclassified report

DESCRIPTORS: (Compatibility of Energy, Storage, Materials, Liquids, *Corrosive liquids with Steel, Tantalum, Molybdenum, Graphite, Boron compounds, Nitrides, Ceramic materials, Cermets, Refractory materials, Corrosion inhibition.) (Crucibles, Containers for *Lithium compounds, *Borates, *Calcium compounds, Magnesium compounds, *Silicides.) Laboratory equipment, Laboratory furnaces, Test methods, Thermochemistry, Thermal conductivity, Density, Viscosity, High temperature research, Controlled atmospheres, Argon.

Fansteel-80, Ta, Mo, graphite and BN were suitable containment materials for molten lithium metaborate for at least 24 hr in an Ar atmosphere. Fansteel-80 was tested with Li metaborate for 87.5 hr at 1600 F in an Ar atmosphere. No evidence of leakage or contamination of the Li metaborate was noted. CaSi2 was extremely corrosive to all metals including the refractory metals. It was successfully contained in BN for 36 hr. Ceramics and cermets now appear to be the only potential long duration containment materials for CaSi2. The heat content measurements on CaSi2 were extended to 1780 F. A crucible, fabricated from a new type of graphite was installed. This graphite was compatible with Li metaborate. The density of molten Li metaborate was determined between 1570 and 2040 F. The viscosity of this material was determined between 1570 and 1960 F. (Author)

AD-274 104 Div. 25
(TISTP/JW) OTS price $5.60

Carnegie Inst. of Tech., Pittsburgh, Pa.
THE FORCED OSCILLATION OF SHALLOW DRAFT SHIPS.
Final rept.,
by Wook D. Kim, Richard C. MacCamy, and Thomas E. Stelson. Jan 62, 55p. incl. illus. tables, 7 refs.
(Contract Nonr-76021, Proj. S-R009-01-01)
Unclassified report

DESCRIPTORS: (Pitch, Roll, Damping, *Frequency analyzers, Tables.) (Oscillation of *Ship hulls.) (Harmonic analysis, Integral equations.)

An integral equation method is presented for obtaining the pressure on a flat body which is subject to small oscillation in a free surface. Assuming a surface distribution of sources the boundary value problem is reduced to a Fredholm integral equation of the second kind. The asymptotic solution of the integral equation for sufficiently low frequency of oscillation has developed in a power series. A numerical solution is sought for circular and elliptic disks oscillating with heave, roll, and pitch. The dependence of the added mass, added moment of inertia, and damping factor on the frequency were determined. For the motion of high frequency improved numerical results can be obtained by trials with a finer grid on the disk. (Author)

AD-274 107 Div. 25
(TISTM/EJH) OTS price $4.60

Johns Hopkins U., Baltimore, Md.
DESLIP IN ALUMINUM SINGLE CRYSTAL SPECIMENS.
Terminal rept.,
by Robert B. Pond and Eleanor Harrison. Jan 62, 45p. incl. illus. tables, 5 refs.
(Contract AF 49(638)509)
(AFOSR-2304)
Unclassified report

DESCRIPTORS: (*Aluminum, *Single crystals, *Deformation, Elasticity, Plasticity, Mechanical properties, Low temperature research, High temperature research, Photographic analysis, Microphotography.)

By the technique of interferometric cinemicrography, deslip in Al single crystals was observed

as a result of reversing the stress. An explanation of the phenomenon is presented. The technique is also used to evaluate the effects of temperature over the range -150 to +225 F, on the velocity of slip. Unslip of a band during continuing deformation was observed. The deslip phenomenon is not dependent on time, extent of strain, or orientation, but may be dependent on lattice bending. The velocity of slip between -150 and 225 F is relatively unaffected by the mechanical property changes, but is primarily dependent on the frequency of co-active slip bands. Unslip is explained by lattice bending of the elastic type. (Author)

AD-274 116 Div. 25, 17
(TISTM/EJH) OTS price $7.60

Notre Dame U., Ind.
TORSIONAL DEFORMATION OF ALUMINUM AND MAGNESIUM SINGLE CRYSTALS,
by H. S. Choi, C. W. Allen, and B. D. Cullity.
Feb 62, 73p. incl. illus. tables, 25 refs.
(Technical rept. no. 7)
(Contract N7onr-43905, Proj. NR 031-461)
Unclassified report

DESCRIPTORS: (*Aluminum, *Magnesium, *Iron, *Single crystals, *Deformation, Stresses, Shear stresses, Plastic flow, Theory, Preparation.)

This report includes:
TORSIONAL DEFORMATION OF IRON SINGLE CRYSTALS,
by C. W. Allen and B. D. Cullity. Feb 62, (Technical rept. no. 8)

The torsional deformation of Al and Mg crystals was investigated, with particular reference to the dependence of proportional limit on crystal orientation. The proportional limit was governed by the average value of the resolved shear stress on the most highly stressed slip systems, but the proportional limit does not strictly obey a critical-resolved-shear-stress law. The proportional limit of Fe crystals in torsion was governed by the resolved shear stress in the most highly stressed slip systems, averaged around the specimen circumference, and does not obey a critical-resolved shear-stress law. Crystals of most orientations exhibit a stage of easy plastic deformation, similar to easy glide in tensile or shear specimens. Transient deformation, similar to that which occurs in single crystals of other materials, was also observed. (Author)

AD-274 126 Div. 25
(TISTP/JW) OTS price $6.60

Microwave Physics Lab., Mountain View, Calif.
THE ABSORPTION OF MICROWAVE RADIATION IN A PLASMA WHOSE ELECTRON DENSITY VARIES LINEARLY WITH DISTANCE,
by G. F. Herrmann. 1 Feb 62, 56p. incl. illus.
(Technical rept. no. 2)
(Contract AF 30(602)2452, Proj. 5561)
(RADC TDR 62-87) Unclassified report

DESCRIPTORS: (*Plasma physics, *Microwaves, Absorption.) (Electrons, Density.) Partial differential equations.

The absorption of microwave radiation normally incident on a semi-infinite plasma whose density varies linearly from zero to infinity is calculated for a wide range of density gradients and electron collision frequencies, and represented by a single family of curves. This family can be reduced to a single curve which represents the absorption with good accuracy. To test applicability of this data to more general types of plasma profiles, the absorption was computed for various configurations in which the semi-infinite plasma was modified by a variety of boundary conditions at various distances from the cut-off point. The results indicate that the absorption depends most strongly on conditions near cut-off. The data calculated for the semi-infinite plasma is applicable to other types of plasma whose density varies smoothly from zero to infinity. (Author)

AD-274 142 Div. 25, 8
(TISTP/TL) OTS price $3.60

Cruft Lab., Harvard U., Cambridge, Mass.
SCATTERING BY DISCONTINUITIES OF SURFACE WAVES ON A UNIDIRECTIONALLY CONDUCTING SCREEN.
Technical rept.,
by S. R. Seshadri. 15 Jan 62, 29p. incl. illus. 5 refs. (Technical rept. no. 349)
(Contract Nonr-186632, Proj. NR 371-016)
Unclassified report

DESCRIPTORS: (*Electromagnetic waves, *Scattering, Propagation in *Waveguides.) (*Communication systems, *Wire, Conductivity, *Antenna radiation patterns, Helical antennas.)

The propagation of electromagnetic waves in waveguides with anisotropic walls has in recent years assumed practical importance in long-distance waveguide communication. It is shown that an anisotropic planar surface can support a guided wave which is attenuated exponentially in the direction normal to the surface. The spread of the field in this surface waveguide decreases as the angle between the direction of propagation and the direction of the wires becomes close to pi/2. Appropriate boundary conditions applicable at the surface of such a unidirectionally conducting screen are given. Radiation from the open end of such a semi-infinite surface waveguide is treated. The electromagnetic fields produced at the junction of two semi-infinite surface waveguides are examined; the wires composing the two surface waveguides are assumed to be in different directions. A treatment is given for the problem of radiation from the junction formed by a semi-infinite surface waveguide and a perfectly conducting half-plane. For this case, the power reflection coefficient and the radiation pattern are found to be the same as for the open-ended waveguide. (Author)

AD-274 152 Div. 25
(TISTM/EJH) OTS price $5.60

General Electric Co., Schenectady, N. Y.
INVESTIGATION OF SEMICONDUCTING PROPERTIES OF II-VI COMPOUNDS.
Scientific rept. no. 2, 1 Nov 61-1 Feb 62,
by M. Aven and H. H. Woodbury. 1 Feb 62, 32p. illus. 15 refs.
(Contract AF 19(604)8512, Proj. 4608)
(AFCRL 62-141) Unclassified report

DESCRIPTORS: (*Semiconductors, *Semiconducting films, *Single crystals, Growth, Crystal structure, Solid state physics, Transport properties, Atomic energy levels, Electrical properties, Hall effect, Impurities, Copper, Silver, Gold.) (Diodes, Thin films of Cadmium compounds, Sulfides on Zinc compounds, Tellurides, Luminescence, Fluorescence.) (Zinc compounds, Selenides, Tellurides.)

Experiments with heavily Cu-doped CdS showed this material contains a second phase which can be readily observed and decorates crystalline imperfections. Consideration is given to the possible positions of the thermal acceptor levels for Cu, Ag, and Au in CdS with the objective of preparing p-type CdS without precipitates of a second phase. Hall effect measurements on n-type ZnSe and p-type ZnTe were made; the resulting mobility-temperature relationships were compared to theoretical estimates. The measurements yielded tentative positions for donor levels in ZnSe and acceptor levels in ZnTe. ZnTe-CdS heterojunctions were prepared with current-voltage characteristics indicative of p-i-n and p-n*-n type junction structure. Examination of cross-sections of such junctions revealed a layer which is presumably intrinsic or very weakly n-type. (Author)

AD-274 157 Div. 25, 4, 9
(TISTM/EJH) OTS price $4.60

Applied Physics Lab., Johns Hopkins U., Silver Spring, Md.
TRANSPORT PROPERTIES OF POLAR GAS MIXTURES,
by E. A. Mason and L. Monchick. Jan 62, 42p. incl. illus. tables, 30 refs. (Rept. no. CM-1009)
(Contract NOrd-7386)
Unclassified report

DESCRIPTORS: (Mixtures, *Gases, *Transport properties, Viscosity, *Gas diffusion, *Thermal diffusion, Diffusion, Heat transfer, Theory, Thermodynamics.) (Neon and Ammonia, Argon and Hydrogen compounds, Chlorides, Hydrogen and Water, Sulfur compounds, Dioxides, Ethyl radicals, Chlorides.) Isotopes.

A previously proposed model for the calculation of viscosity, diffusion, and thermal diffusion in dilute polar gases is extended to mixtures. A simple set of combination rules for the potential parameters is postulated and discussed. Available data limit the comparison of calculation and experiment to binary mixtures of a polar and a nonpolar gas. The agreement exhibits a success comparable to that obtained for models and combination rules involving only nonpolar gases. It is concluded that the present model and combination rules can be used to describe the transport properties of mixtures with a fair measure of success. Attempts to refine the combination rules should await more experimental results of high accuracy, especially results on thermal diffusion and diffusion. (Author)

AD-274 165 Div. 25
(TISTP/JW) OTS price $6.60

Magnetogasdynamics Lab., Mass. Inst. of Tech., Cambridge.
CONFINEMENT OF A PARTIALLY IONIZED GAS BY A PERIODIC MAGNETIC FIELD,
by Bert Zauderer. Jan 62, 48p. illus. 24 refs. (Rept. no. 62-2)
(Contract AF 19(604)4551, Proj. 8608)
(AFCRL 62-222) Unclassified report

DESCRIPTORS: (Plasma physics, *Gas ionization, *Magnetic pinch, Electromagnetic fields.) (Shock tubes, Argon, Hydrogen, *Plasma physics.) (Electromagnetic fields, Low frequency.) Schlieren photography.

Two experiments were performed to test the possibility of confining a partially ionized gas by a periodic magnetic field, such that the density of un-ionized gas in contact with the wall be small compared to the density of the magnetically confined plasma. In the first, argon plasma with a 10,000 K temperature, and about 20% degree of ionization was produced in a 6-in. diameter combustion driven shock tube. From the smear photograph and magnetic probe measurements inside the shock tube it was concluded that the outer cm, layer of the plasma was substantially heated and ionized by eddy current heating. Since the edge of the gas was highly ionized it was concluded that a large percentage of the gas was confined by the field. Electrodeless ring discharge was used to produce an argon plasma in the same arrangement. Smear photographs showed that radial shocks were formed at the inside wall of the glass tube every half field cycle and they propagated toward the axis of the tube. Magnetic probes indicated that the field was confining the plasma. A similar experiment in Hydrogen revealed that the speed of sound divided by the tube diameter must be small compared to the angular field frequency to obtain a steady continuous confinement of the plasma by the field. (Author)

AD-274 166 Div. 25
(TISTP/JW) OTS price $2.60

Magnetogasdynamics Lab., Mass. Inst. of Tech., Cambridge.
DIFFUSION OF A PLASMA ACROSS A MAGNETIC FIELD,
by Ronald Stephen Finn. July 61, 16p. illus. 3 refs. (Rept. no. 61-9)
(Contract AF 19(604)4551, Proj. 8608)
(AFCRL-1028) Unclassified report

DESCRIPTORS: (*Gas ionization, Plasma physics, *Magnetic pinch, Ions, *Diffusion, Magnetic fields.) Fluid mechanics.

An investigation of the problem of plasma diffusion through a magnetic field is made through the macroscopic fluid equations. The problem is set up in a simple one-dimensional geometry of a semi-infinite half-space filled with plasma facing a semi-infinite half-space containing a uniform magnetic field, and the equations are used to describe their subsequent behavior. An attempt is made to solve the equations analytically, but their final solution is obtained numerically. The solutions are also used to determine temperature and entropy increases in the plasma. (Author)

AD-274 185 Div. 25, 2
(TISTP/FR) OTS price $4.60

Technical Operations, Inc., Burlington, Mass.
EXPERIMENTAL STUDY OF SCATTERING IN REAL ATMOSPHERES.
Final rept.,
by Ralph G. Eldridge and John C. Johnson.
30 Dec 59, 41p. incl. illus. tables, 9 refs.
(Rept. no. TO-B 59-16; Rept. no. D-161)
(Contract AF 19(604)2175)
(AFCRC TR 60-201) Unclassified report

DESCRIPTORS: (*Light, *Transmission, *Scattering, Fog, Haze, Smokes, Measurement, Instrumentation.) (Balloons, Photoflash bulbs, Cameras.) Light transmission.

The scattering of visible light in hazes and fogs was investigated experimentally, using balloon-borne flash bulb clusters as sources and calibrated cameras as detectors. By defocusing the cameras, measurements of both the direct and the scattered components could be obtained on the same film. Several detectors were stationed on the ground at various distances up to 15 kms from the source. Results indicate that transmission of the direct components decrease exponentially and as the inverse square of the slant range R, while scattered radiation transmission can be described by a different exponential and the inverse first power of the slant range. All transmission constants can be related to the visibility at the time of measurement. Brightness of the aureole surrounding the source decrease inversely as R to the second power sin to the second power theta, where theta is the angular distance from the source as seen by the observer. This is an average relationship applying at all distances and fog densities observed. A general expression for the total flux from a point source reaching an observer is given in terms only of the visibility and the slant range. (Author)

AD-274 187 Div. 25
(TISTP/JW) OTS price $4.60

Sturtevant Div., Westinghouse Electric Corp., Boston, Mass.
THEORETICAL AND EXPERIMENTAL RESEARCH TO ASSIST IN PREPARATION AND DESIGN OF A HIGH FREQUENCY SILICON CARBIDE ACTIVE DEVICE,
by H. C. Chang. Jan 62, 36p. incl. illus. table, 11 refs. (Scientific rept. no. 1 and 2)
(Contract AF 19(604)8499, Proj. 4608)
(AFCRL-62-73) Unclassified report

DESCRIPTORS: (Silicon, Silicon compounds, *Carbides, Radiation tolerance, *Semiconductors.) (High frequency, *Transistors, Thermal utilization, Test equipment.)

The large band gap of silicon carbide makes it an interesting material for use in semiconductor devices which are operable at ambient temperatures in excess of 500 C. Silicon carbide has a higher tolerance to radiation damage than silicon. The objective of the present program is a theoretical and experimental investigation of a high frequency silicon carbide transistor operable at 500 C, prepared by vapor-phase epitaxial growth techniques. The main advantage of the epitaxial growth method is the precise control obtainable over the junction structure. An apparatus for investigating epitaxial growth by the thermal reduction of silicon and carbon compounds was constructed. Preliminary results indicate growth has taken place although this growth shows structural defects. Junctions formed by this technique have shown rectifying properties. A diffusion process is being used as a supplementary method to prepare the junctions necessary for the high frequency transistor. Diffused junction crystals were prepared for evaluation. (Author)

AD-274 188 Div. 25, 4
(TISTM/EJH) OTS price $3.60

Materials Central, Aeronautical Systems Div., Wright-Patterson Air Force Base, Ohio.
THE EFFECT OF PARA-ORTHO SHIFT ON HEAT EXCHANGER DESIGN IN HYDROGEN NITROGEN HEAT EXCHANGE AT HIGH PRESSURES,
by James H. L. Lawler. Dec 60, 29p. incl. illus. tables.
(Proj. no. 3048)
(WADD TN 60-238) Unclassified report

DESCRIPTORS: (*Heat exchangers, Liquefied gases, Hydrogen, Nitrogen, Thermodynamics, High pressure research, Low temperature research, Cryogenics, Design.)

The size of a H2-N2 heat exchanger condenser is exponentially a function of flow ratio of #N2/#H2. This is in agreement with the literature. The function is such that at 800 psia H and 20 atm (194 psia) or 33.5 atm N2 being cooled from 300 or 500 R, a straight line assumption is reasonable below the flow ratio of 5#N2/#H2 (the constants 2,4,5,6,7, and 8 represent 2 through 8# of N2 condensed per #H2). Above this value the assumption is poor. The effect of hydrogen para-ortho shift on heat exchanger design is small at low ratios of #N2/#H2 up to 3#N2/#H2. Above this value it becomes a minor factor and should be considered. Above 5#N2/#H2 the para-ortho shift affects the size of an exchange 25% or more and is a major factor. (Author)

AD-274 205 Div. 25
(TISTP/TL) OTS price $1.60

Seismological Observatory, John Carroll U., Cleveland, Ohio.
MEASUREMENTS OF THE VELOCITY AND ABSORPTION OF ULTRASOUND IN LIQUID GALLIUM,
by R. L. Proffit and E. F. Carome. 1 Mar 62, 9p. incl. illus. tables, 7 refs. (Technical rept. no. 5)
(Contract Nonr-257701, Proj. NR 384-309)
Unclassified report

DESCRIPTORS: (*Gallium, Liquids, Measurement of Velocity and Absorption of *Ultrasonics.) (Instrumentation, *Interferometers.) *Low temperature research.

Ultrasonic velocity measurements were made in liquid gallium over the temperature range from 20 to 40 C. The value of the velocity measured at the freezing point, 29.8 C, is 2871.1 ± 0.3 m/sec and the temperature coefficient of velocity is -0.3 m/sec/C. Preliminary absorption measurements also have been made, and the measured value of α/ν^2 is $2.5 \pm 0.3 \times 10^{-17}$ cm^{-1} sec^2 at 30 C. (Author)

AD-274 208 Div. 25, 9
(TISTB/AW) OTS price $2.75

California U., Los Angeles, Calif.
A BIBLIOGRAPHY ON AEROSONICS,
by Alan Powell and T. J. B. Smith. Feb 62, 138p. refs. (Rept. no. 62-4)
(Contract Nonr-23362, Proj. NR 062-299-1-28-60)
Unclassified report

DESCRIPTORS: (*Bibliography, *Sound, *Acoustics, Aerodynamics, Hydrodynamics, Fluid mechanics.) (*Noise, Jet acoustic oscillations, Jet engine noise, Jet plane noise, Propeller noise.) (Turbulence, Resonance, Shock waves, Sound transmission.)

This bibliography consists mainly of references to open literature relating to those sections of acoustics which are particularly associated with fluid motion and thermal action. (Author)

Division 25 - PHYSICS

AD-274 209 Div. 25, 12
(TISTP/TL) OTS price $4.60

Illinois U., Urbana.
ANALYSIS OF MISSILE LAUNCHERS, PART M1. A TWO POINT MASS MOVING ON A FLEXIBLE BEAM.
Technical rept. no. 214 on Dynamics of Missile Launchers,
by C. C. Fretwell. Mar 62, 37p. incl. illus. tables.
(Contract DA 11-070-508-ORD-593, Proj. 517-01-002)
Unclassified report

DESCRIPTORS: (Analysis of a *Guided missile on a *Missile launcher.) (Integral equation of Motion on *Flexible beams and Guided missile, Numerical analysis is developed for solution.) (Beams, Loading, Dynamics.)

An approximate analysis is presented of the motion of a flexible launcher rail which is supported by a flexible understructure and is loaded by a missile with two point contact which moves across the rail under the action of a prescribed thrust force. The launcher system is represented by a uniform flexible beam which is supported by linear springs and the missile is constrained to remain in contact with the beam. A pair of coupled integral equations are obtained which define the motion of the missile and a numerical technique of integration is developed for their solution. Finally some numerical results are presented to show the effects of some of the parameters on the motion of the missile and the rail. (Author)

AD-274 218 Div. 25
(TISTP/TL) OTS price $4.60

AVCO Everett Research Lab., Everett, Mass.
EXPERIMENTAL INVESTIGATION OF COLLISION-FREE SHOCKS AND PLASMAS,
by R. M. Patrick and M. Camac. Sep 61, 38p. incl. illus. 19 refs. (Research rept. no. 122)
(Contract AF 49(638)61, Proj. 9751)
(AFOSR-2266) Unclassified report

DESCRIPTORS: (*Plasma physics of collision-free Ionization, *Shock waves.) (*Magnetic fields, Measurement, *Magnetohydrodynamics.) (Electrons, Temperature based on Ultraviolet radiation.) (Heat transfer from plasma to Shock tubes (Walls).)

Investigation of the structure of a shock wave provides an excellent opportunity for studying the dissipation processes in collision-free plasmas. Measurements of the magnetic field have shown that the magnitude of the field change across the shock agrees with that expected from the conservation equations. The electron temperature was estimated to be above 10 electron volts based on the ultraviolet radiation intensity and the ratio of bound-bound and free-free radiation. Measurements of the heat transfer from the plasma to the shock tube wall indicates that less than 1/10 of the gas energy is dissipated to the walls; thus, there is good containment of the shock heated plasma for a time large (50 times) compared to the shock rise transit time. The results of these experiments show that the collision-free thickness is inversely proportional to the Alfven Mach number of the shock. The radiation emitted by the shock heated plasma has been measured over a large range in plasma density; these results, together with those for the magnetic field jump across the shock, show that the performance of the MAST can be predicted by a theory which assumes infinite plasma conductivity. (Author)

AD-274 247 Div. 25, 3
(TISTP/TL) OTS price $1.60

Little, Arthur D., Inc., Cambridge, Mass.
RESEARCH IN ELECTRICAL PHENOMENA ASSOCIATED WITH AEROSOLS.
Quarterly rept. no. 5, 15 July-15 Oct 61,
by Bernard Vonnegut, Arnold W. Doyle, and D. Read Moffett. 15 Oct 61, 16p. incl. illus.
(Contract DA 18-108-405-cml-852)
Unclassified report

DESCRIPTORS: (*Electric fields phenomena associated with *Aerosols, Electrons, *Particles.) (*Drops, Evaporation, Voltage, Water, Surface tension, Electrical properties, Electrostatic precipitation.) (Spray nozzles, Atomization, Scattering.)

The fate of charge on a charged volatile particle was investigated. Charged droplets were held suspended in an electric field and allowed to evaporate. Charge and mass were measured as a function of time. Charged water drops evaporate until the electrical forces on the surface are equal to the surface tension forces at which time the droplets disrupt to eject a number of small highly charged droplets. The fraction of charge and mass lost with each ejection and the effect of maximum charging on evaporation rate of a drop are discussed. (Author)

AD-274 248 Div. 25
(TISTP/TL) OTS price $2.60

North Carolina State Coll., Raleigh.
THERMODYNAMIC THEORY OF ELASTIC RELAXATION,
by Josef Meixner and tr by Jane A. C. Burlak.
Mar 62, 23p. 13 refs. (Rept. no. ERD-148/1)
(Contract DA 01-009-ORD-991)
Unclassified report

DESCRIPTORS: (*Thermodynamics, *Theory of *Elasticity, Viscosity, *Relaxation time.) (*Irreversible processes, Matrix algebra, Integral transforms.)

Assuming that the relaxation phenomena of a system may be described by the introduction of internal variables and the application of the thermodynamics of irreversible processes, general properties of relaxing systems with arbitrarily many external variables are examined. In particular, the transition to the after-effect theory of relaxation phenomena is carried out, several properties of the after-effect matrix and its Laplace transforms are stated and proved, the thermodynamic potentials are expressed in terms of the after-effect functions and two gereral theorems on relaxation spectra are proved. The discussion is carried through for the case of elastic relaxation taking into account the most general properties of viscoelastic bodies. (Author)

AD-274 249 Div. 25
(TISTP/TL) OTS price $10.10

Minnesota U., Minneapolis.
DESIGN AND CONSTRUCTION OF A MASS-SPECTROMETER FOR THE STUDY OF BASIC PROCESSES IN PLASMA PHYSICS.
Rept. for July 60-July 61 on Project Defender,
by M. Mosharrafa and H. J. Oskam. July 61, 86p. incl. illus. tables, refs. (Technical rept. no. 2)
(Contract Nonr-71037)
Unclassified report

DESCRIPTORS: (*Mass spectrometers, Design for *Plasma physics.) (Excitation, Ions, Measurement, Gases, Quadrupole moments, Thermoelectricity.) (Electronic equipment, Vacuum systems.)

The measurement of the types of ions present in gaseous plasmas and their behavior as a function of time, gas pressure, method of plasma excitation, etc., is believed to be a necessity for obtaining conclusive interpretations of a large number of phenomena occurring in these plasmas. The theory of a mass-spectrometer of the quadrupole-field type is given. The reasons which led to the choice of this type of mass-spectrometer for the study of basic collision processes occurring in gaseous plasmas are discussed in detail. The mass-spectrometer can be outgassed at a temperature of 400 C to ensure ultra-high gas purity. Construction details of the mass-spectrometer, the associated electronic equipment and vacuum system are included. (Author)

AD-274 250 Div. 25, 2
(TISTP/FR) OTS price $5.60

Maryland U., College Park.
ATMOSPHERIC EXCITATIONS PRODUCED BY FAST ELECTRONS.
Master's thesis,
by Richard E. Payne. Feb 62, 42p. incl. tables, 21 refs. (Scientific rept. no. 4)
(Contract AF 19(604)3861, Proj. 8605)
(AFCRL 62-255) Unclassified report

DESCRIPTORS: (*Air, *Electron bombardment, *Spectrographic analysis.) (Electrons, Scattering, Air, Secondary emission.) Spectrographic data, *Electron guns.

Experiments are described which were undertaken to determine the spectra produced by electrons with energies of less than 150 ev when colliding with air molecules. From these spectra are calculated absolute intensities of the spectral lines and an estimate of the efficiency of the electrons in producing photons. A beam of electrons of energies varying from 50 to 150 ev was used to excite and ionize gas molecules and ions in a vacuum bell jar at pressures of 5 times 10 to the minus 4 to 5 times 10 to the minus 2 mm of mercury. The light resulting from the de-excitation and recombination was focused on the entrance slit of a Jarrell-Ash two-meter spectrometer by a system of two lenses. Photographs were taken of the spectrum in the wavelength range 3500 to 6000 A and the wavelengths of the spectral lines determined. (Author)

AD-274 266 Div. 25, 8
(TISTP/JW) OTS price $7.60

RCA Victor Co., Ltd. (Canada).
MODULATED ELECTRON BEAM DIAGNOSTICS IN PLASMAS.
Final rept.,
by T. W. Johnston. Jan 62, 51p. illus.
(Subcontract to Canadian Commercial Corp., Washington, D. C., Contract AF 19(604)7246, Proj. 5561)
Unclassified report

DESCRIPTORS: (Measurement and Analysis of *Plasma physics with *Electron beams.) (Electron beams, Scattering in Plasma physics, Argon.)

The feasibility of modulated electron beam diagnostics in warm plasmas is applied to an actual system. It was concluded that, since the scattering of the beam electrons by neutral particles forces the use of high beam voltages which, in turn, makes the bunching length impracticably long, the diagnostic would be useful only in discharges at low gas densities and relatively high electron densities. The experiment has yet to be tried in such a plasma system. Strong electron density oscillations were detected by a fast-acting microwave system in the apparently steady hot-cathode argon discharge. Optical studies and a plot of oscillation frequency vs gas pressure showed that the oscillations were examples of the well-known moving striations. (Author)

AD-274 272 Div. 25
(TISTP/TL) OTS price $3.60

Space Technology Labs., Inc., Los Angeles, Calif.
ELECTRON ATTACHMENT OF SeF6,
by F. N. Mastrup. 20 June 61, 29p. incl. illus. tables (Scientific rept. no. 3; Rept. no. 8967-6003-RU-000)
(Contract AF 19(604)7985, Proj. 7673)
(AFCRL 62-419) Unclassified report

DESCRIPTORS: (*Electrons, *Selenium compounds, Fluorides, Measurement of Impact shock with Ions.) (Electron capture, Molecules, Vibration, Frequency negative ion study.) Quantum mechanics.

During recent years, formation of negative ions has received considerable attention because of its intimate relationship to atmospheric physics and to some plasmas of low and moderate temperatures. Experimental results recently obtained in a laboratory study on the formation of negative ions of SeF6 by collisions with electrons having energies in the range from 0.1 eV - 1.5 eV are discussed. This analysis deals with attachment through two-body collisions. (Author)

AD-274 275 Div. 25, 26
(TISTM/EJH) OTS price $1.60

TYCO, Inc., Waltham, Mass.
THE TRAVELLING SOLVENT METHOD OF CRYSTAL GROWTH.
Quarterly rept. no. 3, 15 Nov 61-15 Feb 62,
by M. Weinstein, S. D. Axelrod and A. I. Mlavsky.
8 Mar 62, 14p. incl. illus. tables.
(Contract AF 19(604)8803, Proj. 4608)
(AFCRL 62-156) Unclassified report

DESCRIPTORS: (*Semiconductors, Sandwich construction, *Single crystals, Growth, Manufacturing methods, Impurities, Electrical properties, Resistance, Hall effect, *Intermetallic compounds.) (Deposits of Gallium on Gallium compounds, Arsenides and Chromium on Silicon compounds, Carbides.) (Penetration of Gallium into Gallium compounds, Arsenides.) Crystal ovens, Laboratory equipment.

Work was carried out in the following areas: Ga-GaAs System; (1) Characterization of the zone movement process, (2) Evaluation of regrown GaAs by Van de Pauw disc technique, and (3) Preparation of ohmic contacts to GaAs. Si-SiC System; (1) Construction of a radiant heating zone passing furnace, (2) Deposition of thin zone of Cr from chromium dicumene, and (3) Preparation of ohmic contacts to SiC. (Author)

AD-274 277 Div. 25
(TISTM/EJH) OTS price $8.10

Uppsala U. (Sweden).
BAND THEORY, VALENCE BOND AND TIGHT-BINDING CALCULATIONS,
by Per-Olov Lowdin. 15 Oct 61, 87p. incl. illus. tables, 146 refs. (Technical note no. 67)
(Contract AF 61(052)351)
(ARL-242) Unclassified report

Presented at the International Conference on Chemical Physics of Nonmetallic Crystals, August 28-31, 1961, at Northwestern University, Evanston, Illinois.

DESCRIPTORS: (*Solids, *Crystals, *Crystal structure, *Quantum mechanics, *Chemical bonds, Electrons, Spin, Atomic orbitals, Theory.) Solid state physics, Valence.

Contents:
Fundamentals of band theory
Hartree-Fock approximation
Translational symmetry
Calculations of band structures
Shortcomings of band theory; correlation error
Valence bond method
Covalent bond; valence bond functions
Dirac-Van Vleck vector model
Extension of valence-bond method
Tight-binding approximation
Basic problems
Recent applications
Virial theorem in theory of ionic crystals
Extension of band theory; different orbitals for different spins
General self-consistent-field theory and exact solution to many-electron problem

AD-274 278 Div. 25, 17
(TISTM/EJH) OTS price $1.60

Uppsala U. (Sweden).
X-RAY INVESTIGATIONS OF Mn_3P, Mn_3P AND Ni_2P,
by Stig Rundqvist. 27 Dec 61, 16p. incl. tables, 16 refs. (Technical note no. 30)
(Contract AF 61(052)40)
(AFOSR-1921) Unclassified report

DESCRIPTORS: (Crystal structure, Single crystals, *Manganese alloys, *Nickel alloys, *Phosphorus alloys, X-ray diffraction analysis, Phase studies, Powder alloys, Preparation.) (Phosphides, Manganese compounds, Nickel compounds.)

The crystal structures of Mn_3P (Fe_3P type), Mn_2P and Ni_2P (revised C 22 type) were refined by single-crystal methods. Both Mn_2P and Ni_2P have appreciable homogeneity ranges. X-ray power investigations in the Mn-P system indicate that the existence of the phase described as Mn_3P_2 is doubtful. Some phase-analytical data for the MnP system are discussed. (Author)

AD-274 287 Div. 25,
(TISTP/TL) OTS price $6.60

AVCO Everett Research Lab., Mass.
EXACT SOLUTIONS TO A CLASS OF TWO-DIMENSIONAL MAGNETOHYDRODYNAMIC FLOW PROBLEMS AT LOW CONDUCTIVITY,
by Richard H. Levy. Nov 61, 59p. incl. illus. 7 refs. (Rept. no. AMP 70)
(Contract AF 04(694)33)
(AFBSD TN 61-31) Unclassified report

DESCRIPTORS: (*Magnetohydrodynamics, *Fluid flow (Two dimensional) in *Magnetic fields.) (Vector analysis, Perturbation theory, Subsonic flow, Supersonic flow, Compressible flow.) Numerical analysis.

Exact solutions are presented to a number of small perturbation magnetohydrodynamic flow problems. The conditions under which the solutions are obtained are as follows: (1) The flow is two-dimensional, and is only slightly perturbed from a uniform flow. (2) The magnetic field vector is also two-dimensional and lies in the plane of the flow. (3) The distortion of the applied field by the induced currents is neglected. (4) Physical boundaries on the flow are one or two infinite plates parallel to the flow direction. (5) The conductivity of the fluid is a scalar quantity, but may very with position. With these assumptions, the perturbations to the flow are calculated for various magnetic fields (chiefly those due to a current flowing in a single wire, and a linear dipole) for incompressible, subsonic and supersonic free stream speeds. Calculations of the pressure on the walls and other quantities are presented for illustrative examples, including cases in which the conductivity is not uniform throughout the flow.

AD-274 288 Div. 25, 9
(TISTP/TL) OTS price $2.60

AVCO Everett Research Lab., Mass.
EXACT SOLUTIONS TO A CLASS OF LINEARIZED MAGNETOHYDRODYNAMIC FLOW PROBLEMS,
by R. H. Levy. Nov 61, 25p. incl. illus. refs.
(Research rept. no. 124)
(Contract AF 04(694)33)
(BSD TDR 62-42) Unclassified report

DESCRIPTORS: (*Magnetohydrodynamics, *Fluid flow.) (Magnetic fields, Vector analysis, Incompressible flow or *Supersonic flow in Shock tubes.) (*Perturbation theory, Partial differential equations.

A general discussion of the properties of magnetohydrodynamic flows at low conductivity is given, and then attention is restricted to the class of such flows satisfying the following conditions: (1) The flow is steady, two-dimensional, inviscid, and only slightly perturbed from uniform conditions. (2) The magnetic field vector is also two-dimensional and lies in the plane of the flow. (3) The distortion of the applied field by the induced currents is negligible. (4) Physical boundaries on the flow are one or two infinite plates parallel to the flow direction. (5) The conductivity of the fluid is a scalar quantity, but may vary in a restricted manner with position. With these assumptions, the perturbations to the flow are calculated exactly for arbitrary magnetic fields for the cases in which the undisturbed flow is either incompressible or supersonic. Illustrative examples for simple magnetic fields are evaluated; for some of these examples the subsonic case is also treated. Another particular example is used to show the effect of spatially varying conductivity on the flow. The limits of the applicability of these results are discussed, and general conclusions regarding the nature of the flow perturbation are drawn.

AD-274 295 Div. 25, 4
(TISTM/EJH) OTS price $1.00

Aeronautical Research Lab., Office of Aerospace Research, Wright-Patterson Air Force Base, Ohio.
INTRAMOLECULAR ENERGY TRANSFER: LUMINESCENCE

PHENOMENA IN THE GROUP IV TETRAPHENYLS.
Rept. on Research on Combustion Kinetics,
by S. R. La Paglia. Dec 61, 28p. incl. illus.
36 refs. (ARL rept. no. 156)
(Proj. no. 7013)
Unclassified report

DESCRIPTORS: (*Metalorganic compounds, Carbon compounds, *Silicon compounds, *Germanium compounds, *Tin compounds, *Lead compounds, Phenyl radicals, Benzenes, *Luminescent materials, Phosphorescent materials, *Luminescence, Phosphorescence, Fluorescence, Spectrographic analysis, Ultraviolet spectroscopy, Absorption, Ultraviolet radiation, Excitation, Half life, Phosphoresent decay.) (Theory, Quantum mechanics, Electron transitions.)

Contents:
Introduction to the theory of intramolecular processes in polyatomic molecules
Luminescent properties of the group IV ttraphenyls
Absorption Spectra
Emission Spectra
Excitation Spectra
Kinetic Analysis
Singlet-Triplet Absorption Spectra
Probability of singlet-triplet transitions
Materials
Lifetime Measurements
Spectra

AD-274 299 Div. 25
(TISTP/TL) OTS price $5.60

Army Signal Research and Development Lab., Fort Monmouth, N. J.
LIGHT-SCATTERING MEASUREMENTS AND THE ANALYSIS OF NATURAL AEROSOL SIZE DISTRIBUTIONS,
by Robert W. Fenn. Feb 62, 56p. incl. illus. tables, 24 refs. (ASRDL technical rept. no. 2247)
Unclassified report

DESCRIPTORS: (*Light, Scattering, Measurement, Theory.) (*Optics, *Aerosols, *Particles, *Water, Drops, Refractive index.) (Carbon, Absorption.) *Numerical analysis.

Based on Mie's theory of light scattering by small particles, the optical properties of natural aerosol particles are analyzed. The scattering properties of water droplets (refractive index 1.33), aerosol particles (average refractive index 1.55) and the scattering and absorption properties of carbon particles (refractive index 1.6 - 0.66i) are discussed in detail. Complex scattering functions for power series size distributions have been computed, and results of some light-scattering-function measurements at Island Beach, New Jersey, are compared with the computed scattering functions. (Author)

AD-274 303 Div. 25, 24
(TISTP/TL) OTS price $3.60

Dayton U. Research Inst., Ohio.
HIGH SPEED RECORDING BY RESONATING OPTICAL RESOLVERS.
Rept. on Research on Particle Dynamics,
by W. R. Rambauske and R. H. Keith. Dec 61, 29p. incl. illus. 24 refs.
(Contract AF 33(616)6766, Proj. 7073)
(ARL-147)
Unclassified report

DESCRIPTORS: (*Spectrographic analysis, *High speed cameras, *Optics, *Recording devices, *Light, Time, Optical images.) (Oscilloscopes, Transducers, Photomultipliers.)

The application and design of resonant elements for high-speed spectrographic and camera work seems to be a unique new approach to specific tasks of the analytical physicist, and should provide a useful experimental instrument for the laboratory on earth and in space. Inexpensive construction and ease of operation characterize the new device, which has a time-resolution capability similar to the customary high-speed helium turbine drives with little or none of their operating difficulties. The findings of this preliminary investigation indicate that further study of the properties and applicability of oscillating drives should be of benefit. (Author)

AD-274 317 Div. 25
(TISTP/JW) OTS price $2.60

Rensselaer Polytechnic Inst., Troy, N. Y.
THE LOSS OF MECHANICAL ENERGY IN THE FLOW OF A DISSOCIATING GAS,
by K. Kusukawa and T. Y. Li. Dec 61, 20p. incl. illus. 7 refs. (Rept. no. TR AE 6111)
(Contract AF 49(638)977)
(AFOSR-1967) Unclassified report

DESCRIPTORS: (*Superaerodynamics, *Drag of Airfoils in Supersonic flow, Gases, Dissociation.) (Thermodynamics, Equations of state, Chemical equilibrium, Entropy.)

The problem of nonequilibrium drag is applied to an arbitrary body in steady adiabatic subsonic dissociating gas flow, viscosity, heat conduction and diffusion being neglected. The basic equations are: thermal and caloric equations of state, chemical relaxation equation, general equation of thermodynamic change, and first law of thermodynamics. These basic equations describe completely the thermodynamic behavior of the moving material element subjected to the effects of dissociation and recombination. (Author)

AD-274 318 Div. 25, 9
(TISTP/JW) OTS price $4.60

Rensselaer Polytechnic Inst., Troy, N. Y.
LINEARIZED DISSOCIATING GAS FLOW PAST SLENDER BODIES,
by T. Y. Li and K. C. Wang. Jan 62, 35p. 13 refs.
(Rept. no. TR AE 6201)
(Contract AF 49(638)977)
(AFOSR-2048) Unclassified report

DESCRIPTORS: (Superaerodynamics, Gas flow, Dissociation, Airfoils, Aerodynamic configurations.)

An inviscid, compressible, linearized dissociating gas flow over slender bodies of general cross section is considered. Essentially it is an extension of the conventional slender body theory including the dissociation effects. Both supersonic and subsonic cases are examined. To our present approximation the lateral forces and moments are found the same as those for the conventional case, but there exist additional nonequilibrium terms in the drag expression. If the body is pointed at both ends, the nonequilibrium term is formally the same for both

the supersonic and the subsonic cases except that the sign in the respective cases is just the opposite. Physical aspects of the nonequilibrium drag problem are briefly considered. These considerations show that in the subsonic case the nonequilibrium term represents a drag and in the supersonic case it is a thrust. The supersonic drag of slender bodies of revolution at small angle of attack has been calculated, including dissociatiion effects. (Author)

AD-274 323 Div. 25, 22
(TISTP/JW) OTS price $2.60

Naval Ordnance Lab., White Oak, Md.
DRAG AND STABILITY DATA FOR MODELS OF THE MK 76 MOD 4 PRACTICE BOMB OBTAINED FROM FREE-FLIGHT FIRINGS,
by Leonard E. Crogan. 1 Nov 61, 3p. illus. tables, 2 refs. (Ballistics research rept. no. 56; Rept. no. NOLTR 61-152)
Unclassified report

DESCRIPTORS: (*Bombs, Training ammunition, Wind tunnels, Test equipment.) (Mach number, Drag, Stability, Free fall models, Spark shadowgraph photography.)

A series of 0.45 scale models of the Mk 76 Mod 4 Practice Bomb were fired within the Mach number range of 0.45 to 2.04 to obtain drag and stability coefficients. (Author)

AD-274 326 Div. 25, 9
(TISTM/BRW) OTS price $1.00

National Aeronautics and Space Administration, Washington, D. C.
COMBINATIONS OF TEMPERATURE AND AXIAL COMPRESSION REQUIRED FOR BUCKLING OF A RING-STIFFENED CYLINDER,
by Melvin S. Anderson. Apr 62, 36p. incl. illus. table, 6 refs. (Technical note D-1224)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1224.

DESCRIPTORS: (*Stiffened cylinders, *Buckling, Temperature, Thermal stresses, Stresses, Load distribution, Thermal expansion, Theory, Mathematical analysis, Mathematical prediction.) Cylindrical bodies, Aerodynamic heating.

A theory is presented to predict the buckling temperature of an axially compressed, uniformly heated ring-stiffened cylinder. The cylinder buckles because of the interaction of the axial stress due to applied compressive loads and the circumferential stress resulting from restraint of thermal expansion by the rings. Buckling charts covering a wide range of cylinder proportions are presented for both clamped and simply supported cylinders. The buckling temperature for a given axial loading is determined from a simple equation involving a coefficient given in the buckling charts and the radius-thickness ratio of the cylinder. (Author)

AD-274 359 Div. 25, 9
(TISTP/JW) OTS price $2.60

Rensselaer Polytechnic Inst., Troy, N. Y.
SUPERSONIC DRAG OF SLENDER BODIES IN A SIMPLE DIATOMIC DISSOCIATING GAS,
by Z. S. Chang. Jan 62, 25p. incl. illus. tables, 13 refs. (Rept. no. TR AE 6205)
(Contract AF 49(638)977)
(AFOSR-2163) Unclassified report

DESCRIPTORS: (Superaerodynamics, Fluid mechanics, Gas flow, Dissociation, Drag, Aerodynamic configurations.)

Quantitative results of linear slender-body theory are treated. The drag of two cases is considered; a circular cone and a parabolic spindle. The extra drag due to nonequilibrium effects turns out to be appreciable in one case. For the case of the circular cone, the extra drag is positive, while for the case of the parabolic spindle, the extra drag is negative indicating that the nonequilibrium effects decrease the total drag. (Author)

AD-274 377 Div. 25
(TISTP/JW) OTS price $8.60

Gordon McKay Lab. of Applied Physics, Harvard U., Cambridge, Mass.
LINEAR ARRAYS: CURRENTS, IMPEDANCES, AND FIELDS, III,
by Ronold W. P. King and Sheldon S. Sandler. 25 Jan 62, pp. 49-97 and appendices 6-11, incl. illus. tables, 10 refs. (Scientific rept. no. 12 (Series 2))
(Contract AF 19(604)4118, Proj. 5635)
(AFCRL 62-89) Unclassified report

DESCRIPTORS: (Excitation of *Antennas, Impedance, *Radio waves.) (Electromagnetic waves, Propagation.) Integral equations.

Results are given for the curtain array with three-quarter and one-half wavelength elements. Since the general solution assumes an indeterminate form, a special solution, based on the original Hallen integral equation, is given for arrays with half-wavelength elements. The new quasi zeroth-order theory shows that the conventional assumption of identical current distributions is justified only for the case of half-wavelength elements. The new array solution is extended to arrays with elements of unequal length. This extension follows from the modification of representations for the coupling terms which appear in the integral equation. Two separate cases are considered: all elements driven by slice generators, and arrays with at least one parasitic element. Numerical calculations of the two-element parasitic couplet confirm the well-known phenomenon that the main radiation beam may be directed by adjusting the length of the parasitic element. The solution for the array with elements of unequal length is extended to the Yagi array. Numerical results are presented for a representative three-element Yagi array. (Author)

26. PRODUCTION AND MANAGEMENT

AD-273 955 Div. 26, 14
(TISTM/EJH) OTS price $10.10

Shell Development Co., Emeryville, Calif.
FUNDAMENTALS OF GEAR LUBRICATION.
Final rept., June 56-June 57,
by V. N. Borsoff and R. Lutwack. June 57, 56p. illus. tables (Rept. no. S-13728)
(Contract NOa(s) 53-356-c)
Unclassified report

DESCRIPTORS: (*Gears, Lubrication, High pressure research, High temperature research, Failure (Mechanics), Hardness.) (*Lubricants, *Mineral oils, *Hydraulic gear fluids, Oils, Silicones, Silicates, Esters, Lubricant additives, Phosphorus compounds, Films, Viscosity, Loading.)

Data on viscosity, pressure, and temperature characteristics of 16 oils are presented. Relations between load carrying capacities of oils and their viscosities are discussed. Effects of hardness on gear performance showed numerous advantages of hard gears over soft ones in power transmission applications. The effect of length of contact on load carrying capacity is twofold: the total load carried by gears increases with increased contact length, while unit load decreases. A substantial increase in load carrying capacities of oils at high speeds was noted. Load carrying capacities of oils, as a rule, decreased with the increase in temperature; at 400 F or higher, lubricants formed gummy deposits which act as protective coatings. Previous findings that load carrying capacities of oils are inversely related to wear were confirmed. Studies of extreme pressure lubrication are discussed.

AD-274 059 Div. 26, 17
(TISTM/BRW) OTS price $1.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
PHYSICAL PRINCIPLES OF ELECTRIC-SPARK METAL-WORKING,
by B. R. Lazarenko. 8 Mar 62, 13p. incl. illus. table (Trans. no. FTD-TT-61-186 of Vestnik Akademii Nauk SSSR, no. 6:pp. 49-56, 1959)
Unclassified report

DESCRIPTORS: (Metals, *Spark machining, Electric discharges, Theory, USSR.)

The electric-spark method of working metals, based on the use of the phenomena accompanying the pulsed liberation of electrical energy in a discharge gap, makes it possible to work any electrically conducting material regardless of its physicochemical properties (hardness, viscosity, melting point, chemical composition, etc.) without using an instrument made of harder material. The working electrode is usually made of brass, cast or uncast iron, graphite, or aluminum. No cutting instrument (cutters, drills, milling cutters, broaches, abrasives, etc.) is required. The process is applicable to such operations as the cutting of metals, making holes of any shape and dimensions, grinding, applying coatings, changing the structure of the surface, making non-circular openings with curvilinear axes, and making objects with a wall thickness of several tens of microns. (Author)

AD-274 120 Div. 26, 27
(TISTM/EJH) OTS price $7.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson Air Force Base, Ohio.
ACHIEVEMENTS OF SCIENCE AND ENGINEERING AND PROGRESSIVE INNOVATIONS IN INDUSTRY AND CONSTRUCTION (SELECTED PARTS),
by G. F. Balandin and G. I. Pogodin-Alekseyev. 4 Apr 62, 75p. incl. illus. table (Trans. no. FTD-TT-61-220 of Dostizheniya Nauki i Tekhniki i Peredovoy Opyt v Promyshlennosti i Stroitel'stve, Moskva, no. 3:pp.95-146, 1960)
Unclassified report

DESCRIPTORS: (*Castings, Molding, Manufacturing methods, Rolling mills, *Sheets, Metals, Alloys, Liquid metals, Steel, Iron.) (*Electric welding, *Arc welding, *Welding, Electron beams, Automatic, Pressure, Vibration, Ultrasonics, Slags.) USSR.

Contents:
Modern methods of producing castings
New casting methods (Continuous casting, Casting of Fe sheets (liquid rolling). Slush molding, Vacuum casting, Shell-mold casting, Shell inserts in sand molds)
Achievements and innovations in electric welding of metals
Electric-arc welding (Manual arc welding, Automatic flux welding, Semiautomatic arc welding)
Electric slag welding (Electroslag welding and production, Process pecularities, Methods and equipment for electroslag welding, Application of the electroslag process in steel-smelting
Welding processes (Electron-beam welding, Rotating-arc welding, Pressure welding methods, Vibration in welding

AD-274 137 Div. 26, 30
(TISTM/BRW) OTS price $8.60

SKF Industries, Inc., Philadelphia, Pa.
INFLUENCE OF LUBRICATION ON ENDURANCE OF ROLLING CONTACTS.
Progress rept. no. 2, 22 Sep 61-22 Feb 62, by N. E. Sindlinger, J. A. Martin, and D. F. Huttenlocher. 22 Feb 62, 90p. incl. illus. tables, 48 refs. (Rept. no. AL62T004) (Contract NOw 61-0716-c)
Unclassified report

DESCRIPTORS: (Bearings, *Ball bearings, *Roller bearings, Lubrication, Fatigue (Mechanics).) (*Lubrication, *Elasticity, Deformation, *Hydrodynamics, Theory.) (Films, Electrical conductance, X-ray spectroscopy.) (Surfaces, Failure (Mechanics), Metals, Transport properties, Tracer studies.) Test equipment, Lubricants.

Progress is reported in a comprehensive experimental and theoretical study of lubrication effects on the endurance of rolling contacts. The experimental studies involve 3 basic types of machines (1) the Rolling Four-Ball Tester, (2) a Flat Washer and Rolling Element machine, and (3) a Two-Ball Apparatus being developed for this investigation. In the four-ball and two-ball machines, the contact conditions and lubrication between two balls in rolling contact, both with and without different kinds and degrees of slip, can be studied. Flat washer testing of other element configurations will be conducted. Elastohydrodynamic lubrication theory for the generation of lubricant film pressures between two rollers or balls is reviewed. Recent developments reported in the literature are presented for use in calculating theoretical lubrication parameters. A new electrical conductivity technique for the study of the lubricant and contact conditions in the rolling four-ball tester is described. Radioisotope tracer tests to detect metal transfer under different lubrication conditions in the four-ball machine are in the final prepatory stages. (Author)

Division 26-PRODUCTION AND MANAGEMENT

AD-274 199 Div. 26, 17, 14
(TISTM/BRW) OTS price $2.60

Armour Research Foundation, Chicago, Ill.
DEVELOPMENT OF 2400 F FORGING DIE SYSTEM.
Interim technical progress rept. 28 Dec 61-27 Mar 62,
by H. Nudelman, A. H. Murphy and others. Apr 62, 24p. incl. illus. tables.
(Contract AF 33(600)42861)
(ASD TR 7-886, vol. 4) Unclassified report

DESCRIPTORS: (High temperature research, *Forging, *Dies for Refractory materials, Metals, Ceramic materials, Cermets, Intermetallic compounds, Design.) (Materials, Heat resistant alloys, Titanium compounds, Borides, Silicon compounds, Carbides, Tantalum compounds, Beryllium compounds, Aluminum compounds, Oxides, Graphite, Oxidation, Mechanical properties, Stresses, Graphite compounds, Silicon.) Alloys, Molybdenum alloys, Tungsten alloys, Niobium alloys, Nickel alloys, Chromium alloys.

Work continued on (1) extending the upper temperature limit of the present hot die system, (2) minimizing the required forging sequences by using hot dies, and (3) evaluating new materials for use as a 2400 F forging die. The ultimate objective is a creation of a true hot working technology for refractory metals. The hot die system was installed in the 1000-ton press, and forging experiments were started to determine the upper operating conditions of the system. A die temperature of 1700 F was used while forging parts under the full 1000-ton load of the press. No die deformation was detected under these conditions. A set of dies for use in the extrusion-forging process was cast of Inconel 713C. The evaluation of materials for use as 2400 F die materials was continued. Compression strength tests at 2400 F were conducted on TiB2, KT SiC, Ta2 Be17, Al2O3, high-density graphite, siliconized graphite, and commercial graphite. (Author)

AD-274 242 Div. 26, 17
(TISTM/BRW) OTS price $8.10

General Dynamics/Convair, San Diego, Calif.
HIGH ENERGY IMPACT FORMING PROGRAM PROTOTYPE DESIGN PARAMETERS STUDY PROGRAM.
Phase 2 rept. 8 Aug 61-8 Jan 62,
by Robert A. Kaser and Frank A. Stratton. Feb 62. 84p. incl. illus. table, 30 refs.
(Contract AF 33(600)43035, Proj. 7-848)
(ASD TR 7-848, vol. 2) Unclassified report

DESCRIPTORS: (*Metal forming presses, *Explosive forming, Impact shock, Rubber, Synthetic rubber, Velocity, Pressure, Hydraulic presses, Pneumatic systems.) (Sheets, Aluminum alloys, Stainless steel, Tests, Design, Data.)

Test procedures to determine the basic parameters of the prototype high energy rate rubber pad sheet metal forming machine are described. Results of tests of the effects of energy and velocity on sheet metal formability and design parameters of the prototype machine are given. Existing high energy rate metal forming machines were used with test tooling and blanks to investigate the effects of energies of 64,500 to 565,000 in. lb and velocities of 216 to 622 ips on the formability of Al and stainless steel alloys formed at intervals of 1.3 to 7.75 msec. As energy was increased, an improvement in formability was achieved up to a certain level. Further increases in energy per unit area of the rubber pad and the resulting increases in rubber pressure did not result in conclusive improvements in sheet metal formability. The investigation demonstrated the extremely accurate control of blow energy inherent in the pneumatically operated high energy rate metal forming machine. (Author)

AD-274 281 Div. 26, 17, 1, 12
(TISTM/EJH) OTS price $4.60

Westinghouse Electric Corp., Blairsville, Pa.
HIGH ENERGY RATE EXTRUSION.
Interim technical progress rept. no. 6 on Phase 2, 28 Dec 61-31 Mar 62,
by J. M. Rippel. 31 Mar 62, 35p. incl. illus. tables.
(Contract AF 33(600)41948)
(ASD TR 7-882, vol. 6) Unclassified report

DESCRIPTORS: (Metals, *Aluminum, *Titanium alloys, *Aluminum alloys, Vanadium alloys, *Steel, Stainless steel, Machining, *Extrusion, Explosive forming, Manufacturing methods, Feasibility studies.) (Tools, Machine tools, Dies, Design, Instrumentation.) Airframes, Aircraft, Guided missiles, Spaceships, Alloys.

The investigation of the high energy rate extrusion process continued. The effect of ram mass and reduction ratio was analyzed on pull-off length with results that compare well with experimental data. The Ti-6Al-4V alloy was extruded in 10-ft lengths. Steel extrusions 10 ft long were extruded but they separated inertially into smaller lengths. A braking device was made which gives the desired effect but not to a degree sufficient for making 10-ft extrusions of steel. The extrusion constants for Ti, steel and Al under high-velocity extrusion conditions were determined. The speeds and stresses involved during the extrusion period were measured and an analysis was made of the requirements for a successful braking device. It was concluded that the diameter of the tooling has a direct effect on the length of extrusions. The smaller the diameter at a fixed reduction ratio, the longer the piece which can be obtained. The speed at which the extrusion is produced does not greatly affect the extrusion pressure over the range of speeds from 15 to 500 in./sec. (Author)

AD-274 372 Div. 26, 17
(TISTM/BRW) OTS price $1.60

Battelle Memorial Inst., Columbus.
INVESTIGATION OF HYDROSTATIC EXTRUSION.
Interim technical engineering rept. no 3, 1 Dec 61-28 Feb 62,
by R. J. Fiorentino, A. M. Sabroff and F. W. Boulger. Apr 62, 14p. incl. illus. table.
(Contract AF 33(600)43328)
(ASD TR 62-7-916, vol. 3)
Unclassified report

DESCRIPTORS: (Hydrostatic pressure, *Extrusion, *Steel, *Titanium alloys, Aluminum alloys, Vanadium alloys.) (*Machine tools, Hydraulic presses, Design.) (High pressure research, *Dies, Hydraulic fluids, Hydraulic seals, Metal seals, Rubber seals.) (Stresses, Mathematical analysis, Shear stresses.)

The design of tooling for hydrostatic extrusion of SAE 4340 steel and Ti-6Al-4V Ti alloys was completed and fabrication of the components is under way. The tooling is required to withstand a target pressure of 250,000 psi at temperatures to 500 F. The goal is to extrude T-sections which can be inscribed in a 1-in. circle. Stress analysis of the tooling design indicated that extremely high shear stresses would be imposed on the liner and sleeve rings of the container assembly under the target conditions. This is the case even though the maximum shrink fits possible are to be used between the container-assembly rings. The high shear stresses on the liner bore, for example, indicated the need for tool steels with minimum yield strengths in the order of 300,000 psi at 500 F. In spite of these severe limitations, it appears from the stress analysis results that the tooling will be able to withstand the target pressure at room temperature. and possibly up to 500 F. (Author)

27. PROPULSION SYSTEMS

AD-273 964 Div. 27, 14, 12
(TISTM/BRW) OTS price $11.00

Kidde, Walter, and Co., Inc., Belleville, N. J.
FIBERGLASS MOTOR CASE STUDY POLARIS SECOND STAGE END CLOSURE.
Final rept.,
by T. Siuta. 23 Mar 62, 141p. incl. illus. tables, 11 refs. (Rept. no. 3643-11)
(Contract NOw-61-0497-c)
Unclassified report

DESCRIPTORS: (*Rocket cases, Glass textiles, Filament wound construction, Design, Configuration, Analysis, Model tests, Hydrostatic pressure, Hemispherical shells, Deflection, Equations, Data.) (Guided missiles, Underwater to surface.)

The end contours of the second stage Polaris case were refined to eliminate or minimize bending and points of inflection in the pressurized dome structure. Tests on a polar ported scale model rocket chamber were conducted to demonstrate the successful achievement of this objective. The zero-shear contour is compatible with winding angle and pattern requirements, produces uniform strain distribution throughout the dome structure and conforms to the established deflection characteristics. This empirically determined contour was in complete agreement with the theoretical geodesic contour. The use of this contour results in the attainment of a highly efficient structure in which the longitudinal and circumferential glass filaments are stressed equally. An empirical method was developed which permits the determination of an optimum zero shear contour for different winding angles, patterns and design configurations. Results agree with analytical calculations. (Author)

AD-273 991 Div. 27, 14, 26
(TISTM/EJH) OTS price $1.60

Aerojet-General Corp., Azusa, Calif.
DEVELOPMENT OF IMPROVED HIGH-STRENGTH PREIMPREGNATED MATERIALS FOR FILAMENT-WOUND ROCKET MOTOR CASES.
Informal progress rept. no. 6, 1 Jan-28 Feb 62. 27 Mar 62, 4p. illus. tables (Rept. no. L0525-01-6)
(Contract NOw 61-0642-c)
Unclassified report

DESCRIPTORS: (*Rocket cases, *Filament wound construction, Materials, Fibers, *Synthetic fibers, Filaments, Glass textiles, Impregnation, Coatings, Resins, Heat resistant polymers.) Hydrostatic pressure, High pressure research, High temperature research, Tensile properties, Failure (Mechanics), Tests.

Lot 7 dry roving and Lots 2, 4 and 5 prepreg were evaluated for strand tensile strength and NOL ring tensile strength. Lot 7 was 20E roving with approximately 408 filaments per end and was finished with HTS sizing. Standard 20E roving has 204 filaments per end. The average strand tensile strength for this lot was 334,800 psi and the average NOL ring strength was 322,800 psi. No advantage in strength was indicated by the fiber of smaller diameter. However, an 18-in.-diam chamber fabricated from this material appeared very uniform and had an unusually smooth surface. Lots 4 and 5 prepreg had strand tensile strengths of slightly over 320,000 psi and NOL ring strengths of 336,000 psi and 349,000 psi respectively. The NOL ring strength is between 5 and 10% higher than the strand strength. The opposite is true of the dry glass. A curvilinear mathematical model used in the statistical analysis of dry glass strength data accounted for 75% of the strength variation. Weight per yard and fuzz content are the most significant variables to be controlled in obtaining higher tensile strengths. (Author)

AD-274 044 Div. 27, 12, 10
(TISTA/SEB) OTS price $19.75

Bell Aerosystems Co., Buffalo, N. Y.
RESEARCH ON ZERO-GRAVITY EXPULSION TECHNIQUES.
Final rept.,
by Alexander Krivetsky, William H. Bauer and others. Mar 62, 344p. incl. illus. tables, 126 refs. (Rept. no. 7129-933003)
(Contract NASr-44)
Unclassified report

DESCRIPTORS: (Fuel systems, *Propellant tanks, Pressure capsules for Space flight, *Satellite vehicles, *Spaceships, Space environmental conditions, Weightlessness.) (Mechanics, Pistons, Fuel pumps, Pumps, Diaphragms (Mechanics), Pneumatic devices, Pressure.) (Chemistry, Chemical engineering, Displacement reactions, Surface properties.) (Magnetism, Magnetostriction, Electrostatics, Dielectrics, Electrical effects.) (Liquid rocket propellants, Rocket oxidizers, Rocket fuels.) (Materials, Radiation effects, Acceleration, Porosity, Physical properties, Elasticity, Mechanical properties, Fatigue (Mechanics), Deformation.)

Contents: Synthesis of Expulsion Devices: Morphological approach and expulsion device methods. Expulsion Device Configuration: Diaphragm-type configuration, Bladder-type configuration, Mechanical systems, Surface forces, Orientation systems, Controlled deformation or folding configuration, Hybrid or miscellaneous systems, Electric and magnetic expulsion devices,

and chemical. Space Environment: Temperature, High vacuum, Radiation, Extraterrestrial environments, Accelerations, and Sonic fatigue. Material Considerations: Material-propellant compatibility, Permeability, Radiation, Elongation and ductility, Temperature, Yield strength, Ultimate strength, Modulus of elasticity, Work hardening, Metal-to-metal compatibility, and Vacuum effects. Slosh and Vibration Characteristics: Bladder considerations, Cavitation and fuel spray, Elastic tank breathing mode, and Acoustic modes.

AD-274 069 Div. 27, 14
(TISTM/BRW) OTS price $11.00

North American Aviation, Inc., Downey, Calif.
SANDWICH ROCKET MOTOR CASE PROGRAM.
Interim technical engineering rept. no. 2, 29 Sep 61-23 Mar 62,
by R. W. Spencer, E. H. Baker, and D. H. Wykes. 23 Mar 62, 144p. incl. illus. tables (Rept. no. SID 62-363)
(Contract AF 33(600)43031, Proj. 7-878)
(ASD 7-878, vol. 2) Unclassified report

DESCRIPTORS: (*Rocket cases, *Sandwich construction, *Filament wound construction, Honeycomb cores, Glass textiles, Design, Model tests, Stresses, Mathematical analysis, Laminates, Resins, Reinforcing materials, Nylon, Plastics.) (Monocoques, Beryllium, Steel, Titanium.) (Test methods, Cylindrical bodies, Stresses, Failure (Mechanics), Load distribution.) Expanded plastics, Adhesives, Bonding.

A description is given of the fabrication studies and tests to determine the material allowables for, together with a description of, subscale and full-scale filament-wound sandwich rocket motor cases. The edgewise compression and small-scale sandwich-wall cylinder tests that were initiated to determine design values for sizing the subscale and full-scale sandwich rocket motor cases are summarized. The fabrication process used to build the sandwich-wall cylinders and subscale cases is described in detail, together with the associated mandrel-tooling development studies. Test results of the subscale motor cases are discussed and analyzed. A subscale case was built which exceeded the ultimate design pressure by 10 percent. A detailed stress analysis for the full-scale rocket motor cases is presented, together with design drawings of the motor case, nozzle, and internal insulation. (Author)

AD-274 091 Div. 27, 14, 26, 12
(TISTM/EJH) OTS price $5.60

Bendix Products Div., Bendix Corp., South Bend, Ind.
SERVICES TO GENERATE ENGINEERING DATA ON THE BEHAVIOR OF PLASTIC COMPOSITE STRUCTURES UNDER VARIOUS CONDITIONS OF STRESS.
Final rept., on Phase 2,
by A. L. Courtney. 10 Mar 62, 54p. incl. illus. tables (Rept. no. BPAD-863-14385)
(Contract NOw 61-0488-c)
Unclassified report

DESCRIPTORS: (*Pressure vessels, *Rocket cases, *Filament wound construction, Glass textiles, Resins, Reinforcing materials, Packaging, Wire winding machines, Manufacturing methods, Structures, Design, Stresses, Failure (Mechanics), Hydrostatic pressure, Test methods.)

Studies dealing with tensioning and packaging, reducing stress risers, fabrication of 7-in. pressure vessels, 18-in. rocket cases and bending tests are reported. The 7-in.-diam pressure vessel and the analytical and experimental methods used to derive the end dome configuration are discussed. Comparison of stress values obtained for tape and roving from identical designs were of the same order of magnitude. The tape material compacted better than roving in both the cylindrical and end dome regions because of the more uniform control of width and thickness of the tape. A balanced designed isotensoid geodesically wrapped pressure vessel (12.5 degree longitudinal wrap angle) is weakest in the longitudinal winding at the point of tangency. The design concept for off-center port reinforcements is presented. A method utilizing a filament wound cylinder which can have a pure bending moment applied without special machining is discussed.

AD-274 131 Div. 27, 17, 30
(TISTA/SEB) OTS price $2.60

Stanford Research Inst., Menlo Park, Calif.
TUNGSTEN AND ROCKET MOTORS.
Progress rept. no. 20, 1 Feb-31 Mar 62,
by Gerald M. Gordon and David A. Brown. 1 Apr 62, 11p. illus. table, 5 refs.
(Contract NOrd-18619)
Unclassified report

DESCRIPTORS: (Rocket motors, Solid rocket propellants, *Rocket motor nozzles of *Tungsten, Erosion, Thermal stresses, Shock, Stresses, Tests, Mathematical analysis.) (Effectiveness of Simulation of Exhaust gases by Plasma jets.) High temperature research.

Tungsten erosion is being studied under simulated exhaust conditions by a specially constructed plasma torch apparatus. Thermal shock cracking under rapid heat-up conditions is being investigated and the experimental results will be correlated with a mathematical analysis. (Author)

AD-274 140 Div. 27, 14
(TISTM/EJH) OTS price $2.50

Aerojet-General Corp., Sacramento, Calif.
INVESTIGATION OF MATERIALS CAPABILITIES OF MATERIAL SYSTEMS IN SOLID ROCKET MOTORS. PART II. ANALYSIS OF HEAT TRANSFER FACTORS.
Rept. for 15 June 60-15 May 61, on Refractory Inorganic Non-Metallic Materials,
by E. M. Sadownick. Feb 62, 94p. incl. illus. tables, refs.
(Contract AF 33(616)7365, Proj. 7350)
(WADC TR 59-602, pt. 2)
Unclassified report

DESCRIPTORS: (*Rocket motor nozzles, Rocket motors, Solid rocket propellants, *Refractory materials, Ceramic materials, *Thermal insulation, Thermal conductivity, *Heat transfer, Temperature, Combustion chamber gases, Pressure, Design, Deposits.) Tungsten, Graphite, Carbides, Plastics, Phenolic resins, Asbestos fiber, Steel.

Temperature histories of nozzle materials systems were analyzed parametrically, and a series of hot-flow tests were conducted. Chamber pressure and

gas temperature affect duration capability significantly, but throat diameter does not. Thermophysical properties of the flame barrier and heat sink also affect duration, but, by comparison, the effect of variations of thermophysical properties of the insulator and load-bearing member is relatively small. High product of density and heat capacity, and moderately high thermal conductivity, are desirable for the flame barrier and heat sink. Significant increases in nozzle duration capability are possible when properly oriented anisotropic material is used. Tests of 6 nozzles with varying W flame barrier thicknesses showed fairly good agreement between calculated temperatures and measured data when no Al2O3 was deposited on the walls. When deposition occurred, the measured temperatures were lower than those calculated; the temperatures could be brought close to agreement by considering the thermal blocking effect of the deposit. (Author)

AD-274 186 Div. 27, 14, 4
(TISTM/EJH) OTS price $4.60

Union Carbide Research Inst., Tarrytown, N. Y.
RESEARCH ON PHYSICAL AND CHEMICAL PRINCIPLES AFFECTING HIGH TEMPERATURE MATERIALS FOR ROCKET NOZZLES.
Quarterly progress rept., 1 Jan-31 Mar 62, by Robert Lowrie. 31 Mar 62, 50p. incl. illus. tables, refs.
(Contract DA 30-069-ORD-2787; In cooperation with Parma Research Center, Cleveland, Ohio)
Unclassified report

DESCRIPTORS: (*Rocket motor nozzles, Materials, *Refractory materials, Thermal insulation, Ablation, Corrosion by Exhaust gases, Vaporization, Thermodynamics, Thermal expansion, Electrical properties, Resistance, Hall effect, High temperature research, Mechanical properties, Purification.) (Graphite, *Carbides and *Borides of Hafnium compounds, Niobium compounds, Titanium compounds, Zirconium compounds.) (Tungsten, Tantalum, Molybdenum, Compatibility, Titanium compounds, Borides.) (Zirconium compounds, Borides, Heat of formation.)

Reactions of several new materials (HfB2, HfC and solid solutions of TiC/ZrC and ZrC/Nb with possible rocket exhaust components) were studied. Only HfC in oxidizing atmospheres appeared to have attractive qualities. Preliminary kinetic studies were conducted with TiC and ZTA graphite in mixtures of CO2-CO-Ar. Corrosion of both materials depended linearly upon the CO2 partial pressure; the graphite corroded nearly linearly with time. New phases were observed in corroded carbide and boride samples. Vaporization studies were made to calculate the heat of formation of ZrB2; results thus far indicate a value near -45 kcal/mole. Thermal expansion data on ZrC, TiC and W are in good agreement with literature sources. Studies of the compatibility of TiB2 with W, Ta and Mo showed that Ta and W did not react significantly with TiB2 up to 2100 C but Mo did.

AD-274 217 Div. 27
(TISTA/SEB) OTS price $2.60

Space Sciences Lab., General Electric Co. Philadelphia, Pa.
AN INVESTIGATION OF THE PROPERTIES OF A REPETITIVELY FIRED TWO-STAGE COAXIAL PLASMA ENGINE,
by Per Gloersen, Bernard Gorowitz and others.
Apr 62, 15p. illus. 10 refs. (Rept. no. R62SD28)
Unclassified report

DESCRIPTORS: (*Electric propulsion, Plasma jets, Rocket motors, *Ion rockets, Pressure, Specific impulse, Thrust, Tests.) (Tons of Argon, Oxygen.) (Exhaust gases, Spectrographic analysis, Test methods, Photoelectric effect.) Plasma physics.

A repetitively fired two-stage coaxial plasma engine was successfully operated in a 3 x 13 ft test chamber under conditions closely simulating those of outer space, that is, with negligible interaction between the plasma exhaust and the residual gas in the test chamber. Results of some preliminary measurements of pressure distribution in the engine, thrust, specific impulse, input mass flow, and energy efficiency are presented. A photoelectric spectrum mapping technique was developed which takes advantage of the repetitive nature of the pulsed plasma exhaust. This technique was used to obtain emission spectra from various points inside and beyond the muzzle of the two-stage gun, and was successful in yielding many more spectral lines than the standard photographic technique. Only argon ion and oxygen ion lines appear in all parts of the gun and in the exhaust. Copper and silicon ion lines, which appeared in the exhaust of an earlier single-stage self-triggered coaxial gun, and which indicate erosion of the electrodes and insulators were absent. (Author)

AD-274 329 Div. 27
(TISTA/LSK) OTS price $1.50

National Aeronautics and Space Administration, Washington, D. C.
EFFECTS OF SUCTION BOUNDARY-LAYER CONTROL ON THE PERFORMANCE OF A SHORT ANNULAR DIFFUSER WITH AN UPSTREAM TERMINAL NORMAL SHOCK,
by Charles J. Shoemaker and John R. Henry.
Apr 62, 59p. incl. illus. 5 refs. (Technical note D-1241)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1241.

DESCRIPTORS: (*Diffusers, *Boundary layer control by Aren suction in Turbojet inlets, Ramjet inlets of Turbojet engines, Ramjet engines.)

A normal shock was positioned at distances ranging from 0.4 to 2.0 annulus gaps upstream from the diffuser entrance; the corresponding shock Mach number ranged from 1.40 to 1.47. Boundary-layer suction flows as high as about 13 percent of the diffuser entrance flow were employed. The equivalent conical expansion angle of the diffuser was 10 degrees with about 5-percent suction flow, the over-all total pressure loss of the 10 degrees diffuser was less than that for a 5 degrees diffuser with no boundary-layer control. Pumping-power considerations indicated that suction-flow rates from 5 to 8 percent were economical relative to improved diffuser performance. (Author)

AD-274 335 Div. 27
(TISTA/SEB) OTS price $11.00

Pratt and Whitney Aircraft, West Palm Beach, Fla.
STUDY OF NOZZLES TO SPRAY CONTAMINATED FUEL.
Final rept., 16 June-26 Dec 61, by James P. Mitchell. 9 Feb 62, 135p. incl. illus. tables, refs. (Rept. no. PWA FR-341)
(Contract NOw 61-0606-f)
Unclassified report

DESCRIPTORS: (Effectiveness of *Fuel nozzles when using Contaminated Jet engine fuels.) (*Turbojet engines, Fuel systems, Fuel filters, Fuel injectors, *Turbojet fuel nozzles.) (Fuel injection, Fuel sprays, Distortion by Impurities in Fuels and effect on Combustion.) Fungi.

The effects of contaminated fuel on the performance of turbojet main burner fuel nozzles and the resulting effect on turbojet performance was studied. The fuel used was contaminated with MIL-E-5007B contaminant, plus fungus. The program included a study of the effects of contaminant accumulation on nozzle performance; a study of the effects of poor nozzle performance resulting from the use of contaminated fuel on turbojet performance; nozzle spray tests in which several different nozzles were evaluated during cold-flow contaminated fuel spray tests; burner can tests in which the effects of burning contaminated fuel in a conventional turbojet were determined; a study in which the results of the burner can tests were used to determine the effects of burning contaminated fuel on turbojet performance; and a nozzle design study in which an air atomizing nozzle, an impingement nozzle, and two types of pressure atomizing nozzles were compared to determine which nozzle would be best for spraying contaminated fuel. Contaminant accumulation in the nozzle can distort uniformity of the spray being emitted from a nozzle and also change its flow schedule. Contaminated fuel has little effect on large swirl type nozzles. Air atomizing nozzles have the largest metering passages of the nozzles considered. (Author)

AD-274 393 Div. 27, 14, 4
(TISTM/GEC) OTS price $3.60

Hughes Aircraft Co., Culver City, Calif.
ROCKET LINER PROGRAM.
Quarterly rept. no. 6, 1 Oct 61-1 Jan 62, by S. B. Eglin and A. L. Landis. 1 Jan 62, 27p. incl. tables, 4 refs. (Rept. no. ROC/LIN-6Q)
(Contract DA 04-495-ORD-3079)
Unclassified report

DESCRIPTORS: (Rocket cases, Combustion chamber liners for Solid rocket propellants, *Thermal insulation, Polymers, *Heat resistant polymers.) (Synthesis by Copolymerization, Vinyl radicals, *Metalorganic compounds, *Silicon compounds, *Tin compounds, *Titanium compounds, *Chelate compounds, Processing, Aging with Catalysts.)

Investigation of means of curing metalloxane polymers resulted in the finding that vinyl-containing copolymers can be effectively cured with silicone hydrides. Free radical catalysts, such as organic peroxides, were effective with vinyl-containing copolymers and neither free radical catalysts nor silicone hydrides effect cures with stannosiloxanes not containing vinyl groups. Candidate vinyl-containing stannosiloxane gums and blends of these copolymers with nitrile rubbers and phenolic resins were compounded with appropriate fillers and cured with a silicon hydride. These compositions were molded into test slabs and evaluated for insulative capability by the standard torch test. The results of these tests, in terms of insulation index and erosion rate, showed that cured stannosiloxanes were substantially superior to methylsilicone rubbers and significantly better than methylphenylsilicone rubbers. (Author)

28. PSYCHOLOGY AND HUMAN ENGINEERING

AD-274 035 Div. 28, 26
(TISTB/AW) OTS price $8.60

RAND Corp., Santa Monica, Calif.
HUMAN FACTORS IN AUTOMATIC CHECKOUT EQUIPMENT: AN ANNOTATED BIBLIOGRAPHY.
Mar 62, 88p. refs. (Memo. no. RM-2756-PR)
(Contract AF 49(638)700; In cooperation with Dunlap and Associates, Inc.)
Unclassified report

DESCRIPTORS: (*Bibliography, *Maintenance, *Human engineering.) (*Automation, Maintenance personnel, Training, Attention.) (Electronic equipment, Computers, Flight instruments.) (Time, Costs, Quality control.)

A simple five-category system was used in organizing the documents. The five subject areas are: (1) general philosophy and review of automatic checkout methods, (2) maintainability directives and guides, (3) models of the maintenance process, (4) human performance of checkout and fault-isolation tasks, and (5) specific checkout systems. (Author)

AD-274 244 Div. 28
(TISTB/LH) OTS price $3.60

Human Engineering Lab., Aberdeen Proving Ground, Md.
HELICOPTER ARMAMENT PROGRAM. AIR-TO-GROUND RANGE ESTIMATION,
by Gerald Goldstone and Lynn C. Oatman. Jan 62, 28p. incl. illus. tables, 5 refs. (Technical memo. no. 2-62)
Unclassified report

DESCRIPTORS: (*Range, Air to surface, Space perception.) (*Aerial reconnaissance, *Target recognition from Helicopters, Human engineering, Effectiveness.)

A study was conducted to investigate the ability of an observer to estimate slant range from altitudes of 50, 100, and 150 feet, utilizing both pop-up and running modes of flight over various terrain types. Twenty percent of the range estimates had overcalls of no greater than 9 percent error and undercalls of no greater than 6 percent error. The results of the course and altitude variables did not yield a statistically significant difference under either the running or pop-up mode of flight. (Author)

29. QUARTERMASTER EQUIPMENT AND SUPPLIES

No Entries

30. RESEARCH AND RESEARCH EQUIPMENT

AD-273 987 Div. 30, 27, 25
(TISTA/VGW) OTS price $1.25

Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
ACOUSTICAL EVALUATION OF TWO DURASTACK GROUND RUN-UP NOISE SUPPRESSORS.
Rept. on Human Response to Vibratory Energy, by Norman Doelling. Nov 61, 41p. incl. illus. (Contract AF 33(616)3335, Proj. 7210)
(WADC TN 57-392) Unclassified report

DESCRIPTORS: (Tests, Effectiveness, *Suppressors, *Jet engine noise, Acoustic insulation, Sound, Pressure, Sound transmission, Test facilities.)

Measurements of the noise characteristics of two Durastack noise suppressor systems are reported. The only difference in the two systems is the acoustical treatment of the secondary air intake. Type A suppressor has essentially no acoustical treatment in the secondary air intake while Type B is acoustically treated. Measurements in octave bands taken on a 25-foot circle and at close-in positions are presented. Average noise reduction of both types of suppressors is fairly flat above the first octave band. The average value of the noise reduction from 75 to 10,000 cps is about 14 db for the Type A noise suppressor and about 21 db for the Type B noise suppressor. No intake suppressor was used. The relative magnitude of the major noise sources of the aircraft suppressor is also presented. Some non-acoustical aspects of the noise suppressors are included. (Author)

AD-274 028 Div. 30, 8
(TISTP/FR) OTS price $9.10

Office of Aerospace Research, Washington, D. C.
PROJECT CAT EYE: A HISTORY OF LIGHT AMPLIFICATION RESEARCH AT THE AERONAUTICAL RESEARCH LABORATORY 1952-1960.
Mar 62, 96p. refs. (Rept. no. OAR-4)
Unclassified report

DESCRIPTORS: (Light, Amplifiers, *Research program administration.) (*Photoelectric effect, Photoelectric transducers.) Photons.

This historical survey was undertaken as a case study in Air Force research activities as conducted at the Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Ohio. While it primarily concerns the work on Project 7072, Research on the Quantum Nature of Light, at one Air Force laboratory, the study may also be construed as throwing some light on the problems and achievements of Air Force research in general. (Author)

AD-274 039 Div. 30
(TISTW/EET) OTS price $23.50

Ballistic Research Labs., Aberdeen Proving Ground, Md.
PROCEEDINGS OF THE FOURTH SHOCK TUBE SYMPOSIUM 18-20 APRIL 1961,
comp. by George D. Teel. Feb 62, 476p. incl. illus. tables, refs. (BRL rept. no. 1160)
(DA Proj. no. 503-04-002)
Unclassified report

DESCRIPTORS: (*Shock tubes, *Symposia.) (Instrumentation, Operation and Construction of Shock tubes.) Hypersonic wind tunnels.

Contents:
NOL model nuclear airblast simulator
The soil filled shock tube
A shock tube modified to produce sharp-rising overpressures of 400 milliseconds duration
A high explosive operated shock tube with facilities for testing structures
Volume detonation in shock tubes
High pressure loading device for evaluating blast closure performance
Techniques for producing long-duration loads in the NCEL blast simulator
Arc heating technique for shock tube driver
Pressure and heat-transfer instrumentation used in the NOL hypersonic shock tunnels
Measurements in the hypersonic shock tunnel at I. S. L.
Shock wave decay in tunnels
Republic 24-in hypervelocity wind tunnel

AD-274 130 Div. 30
(TISTP/JW) OTS price $6.60

David Taylor Model Basin, Washington, D. C.
A BASIC SET OF MATHEMATICAL SUBROUTINES FOR LARC,
by Naomi C. Millet. Mar 61, 63p. incl. illus. tables, 6 refs. (Rept. no. 1303)
Unclassified report

DESCRIPTORS: (*Data processing systems, *Digital computers, *Coding, Programming.) (Computer logic, Mathematical logic, Tables.)

A basic set of selected mathematical subroutines for LARC is presented. Each subroutine was analyzed, then code-checked on UNIVAC I using LARC assembly and simulation routines (LISA and LIS). Information is given for each subroutine in a form for easy application. Derivations of numerical methods used, tables of computed values obtained from running the subroutines, and the true values are included. (Author)

AD-274 175 Div. 30, 1
(TISTA/LSK) OTS price $14.00

Goodyear Aircraft Corp., Akron, Ohio.
INVESTIGATION OF DIGITAL SIMULATION OF AIRCRAFT SYSTEMS,
by Kenneth L. Rowan. 26 June 61, 219p. incl. illus. tables (GER-10017)
(Contract N61339-772)
(NAVTRADEVCEN 772) Unclassified report

DESCRIPTORS: (*Digital computers, *Flight simulators, *Training devices, Standardization of Simulation, Aircraft, Flaps, Pneumatic systems, Hydraulic systems, Turbojet engines, Fuel systems, Landing gear, Electrical equipment of Jet planes, Jet bombers, Attack bombers, Jet fighters, Patrol planes.) (Automatic, Programming, Mathematical logic.)

Feasibility and methods of digitally simulating generalized aircraft systems were studied. The following systems were considered: (1) wing flaps, (2) high pressure pneumatic, (3) hydraulic, (4) engine control, (5) fuel, (6) landing gear, and (7) electrical. To develop generalized systems, F4H-1, A4D-1, A4D-2, FJ-2, P6M, F9F,

F3H-2N, and F-102A aircraft were studied. Logical flow charts accompanied by the mathematical relations to simulate digitally the indicated aircraft systems were prepared. Simulation of the systems can be facilitated by special devices. For a particular aircraft to be simulated, the appropriate inputs and the general simulation program could be combined by an assembly program to produce an optimized object program. Analysis of the fuel and electrical systems showed that simulation and generalization can best be accomplished by the development of an assembly program. A computer word (or words) having digits corresponding to the inputs and outputs of a system could be used to control most of the simulation logic. Incorporation of these special devices could significantly reduce equipment requirements and aid systems simulation. (Author)

AD-274 177 Div. 30, 8
(TISTP/FR) OTS price $14.50

RCA Industrial Electronic Products, Camden, N. J.
PROJECT LIGHTNING.
Interim research rept. no. 11A, 1 June-31 Aug 61, on High-Speed Data Processor System Research.
31 Aug 61, 1v. incl. illus. tables.
(Contract NObsr-77523)
Unclassified report

DESCRIPTORS: (*Computer logic, *Triggered gates, Transistors, *Diodes, Delay circuits.) Digital computers, *Memory devices, Programming.

The quarter's work concentrated upon completing the frozen designs, both electrical and mechanical, and beginning construction of the subsystem. To be completed during Phase III B, this subsystem will demonstrate feasibility of the techniques developed during the course of Project LIGHTNING. The worst-case designs of the logic subsystem were finalized, and all types of wafers were constructed and tested. Performance of these wafers was essentially in agreement with analytic calculations. It is believed that the subsystem can be built with no further key invention required. (Author)

AD-274 178 Div. 30
(TISTP/FR) OTS price $4.60

RCA Industrial Electronic Products, Camden, N. J.
PROJECT LIGHTNING.
System Study rept. no. 7, Appendix 2, 1 June-31 Aug 61 on High-Speed Data Processor System Research,
by M. Sendrow. 31 Aug 61, 45p. incl. illus.
(Appendix 2 to Interim research rept. no. 11A, AD-274 177)
(Contract NObsr-77523)
Unclassified report

DESCRIPTORS: (Digital computers, *Programming.)

The design of a computing system proposed under different assumptions from the ones previously proposed under this title is detailed. The structure of the machine is outlined; the registers, sequencing, addressing, instruction repertoire, and the elaborate input-output system are described. Many questions of detail remain to be worked out. (Author)

AD-274 179 Div. 30, 8
(TISTP/FR) OTS price $8.60

RCA Industrial Electronic Products, Camden, N. J.
PROJECT LIGHTNING.
Suppl. to Interim research rept. no. 11A, on High-Speed Data Processor System Research.
1 Sep 61, 90p. incl. illus. tables (Suppl. to Interim research rept. no. 11A, AD-274 177)
(Contract NObsr-77523)
Unclassified report

DESCRIPTORS: (*Diodes, Gallium compounds, Arsenides.) (*Computer logic, Trigger circuits.) Memory devices, Triggered gates.

Contents:
Tunneling device research
Task II
Task III
Certain additions in the areas of logic circuits and fabrication techniques.

AD-274 219 Div. 30, 9
(TISTA/LSK) OTS price $4.60

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
FEASIBILITY OF A DIFFUSER CENTERBODY INJECTOR FOR THE 16-FOOT SUPERSONIC TUNNEL OF THE PROPULSION WIND TUNNEL FACILITY,
by E. H. Sloan, Jr. and M. W. Davis. Apr 62, 36p. incl. illus. tables, 11 refs. (Rept. no. AEDC TDR 62-75)
(Contract AF 40(600)800)
Unclassified report

DESCRIPTORS: (*Supersonic wind tunnels, Design.) (*Supersonic diffusers, *Injectors, Configuration, Feasibility studies, Effectiveness, Pressure.)

A centerbody injector for reducing the pressure ratio required to operate the 16-Ft Supersonic Tunnel of the Propulsion Wind Tunnel Facility has been investigated analytically, and several configurations were tested in the Supersonic Model Tunnel. The injectors were fitted to the existing scavenging scoop centerbody so that secondary air routed through the scavenge ducting is introduced just downstream of the minimum area of the variable geometry diffuser. The results obtained from the best tip injector system, with respect to the running pressure ratio at M equals 5.0, ranged from a 36% improvement with the injector air off to a 52% improvement with the maximum tolerable air injection over the data from the closed aerodynamic scoop tip. (Author)

AD-274 262 Div. 30, 25
(TISTP/JW) OTS price $4.60

Parke Mathematical Labs., Inc., Carlisle, Mass.
MATHEMATICAL METHODS IN ACOUSTIC TRANSDUCER ARRAY THEORY.
Final rept.,
by N. G. Parke, III. Dec 61, 39p. illus.
(Contract N140(70024)70754B)
Unclassified report

DESCRIPTORS: (*Acoustics, *Transducers, Mathematical logic, Display systems.) (Sound, *Analog systems, Pressure, Distribution, Mathematical analysis.)

Analytical ideas and calculations are presented with preliminary ideas for analog pressure distribution calculation and display. It is felt that both analogs and mathematical analysis have much to offer in gaining an understanding of various features of the near sound field of transducers and arrays. (Author)

AD-274 271 Div. 30, 2, 25
(TISTP/GRW) OTS price $1.60

Schonstedt Engineering Co., Silver Spring, Md.
DEVELOPMENT OF SINGLE-COMPONENT MAGNETOMETER HELIFLUX SENSOR TYPE MODEL CRC-Iλ.
Final rept.,
by Erick O. Schonstedt. 16 Dec 61, 23p. incl. illus. 4 refs.
(Contract AF 19(604)2139, Proj. 7601)
(AFCRL-1099) Unclassified report

DESCRIPTORS: (*Magnetometers, Tests, Sensitivity.) (Terrestrial magnetism, Periodic variations.)

A portable, single-component magnetometer of the second-harmonic type was developed using the HeliFlux sensor for recording time variations of the Earth's magnetic field. In the resulting transistorized Model CRC-1X Magnetometer, the major portion of the ambient field is nulled out by controls which may be used to adjust the center-scale value of the recording meter to any value between 0 and 75,000 gammas in 25-gamma steps. Time variations of the magnetic field may then be read with an accuracy of ± 1 gamma or better when the instrument is operated at its maximum sensitivity of ± 50 gammas full scale at a constant temperature between 20 and 100 F. Temperature drift is 0.1 gamma or less per degree Fahrenheitin this range. Lower sensitivities are also provided. The magnetometer is not intended as an absolute measuring device and the accuracy with which the center-scale value of the meter is set is ± 1%. However, the 25-gamma steps used for adjusting this value are sufficiently small so that the full sensitivity of the instrument can be utilized for the time variations measurements in any ambient field likely to be encountered, providing these variations do not exceed the ± 50 gammas full-scale values. (Author)

AD-274 285 Div. 30, 8, 5
(TISTE/NTM) OTS price $3.60

Armour Research Foundation, Chicago, Ill.
INSTRUMENTATION AND MEASUREMENT TECHNIQUES STUDY.
Quarterly progress rept. no. 12, 1 Nov 61-31 Jan 62,
by A. T. Ashby. 31 Jan 62, 34p. incl. illus. table (Rept. no. ARF 5112-36)
(Contract DA 36-039-sc-78269, Proj. 3G89-01-021-01)
Unclassified report

DESCRIPTORS: (Test sets, Test equipment, Test methods, *Test facilities, Military equipment, *Electronic equipment, Instrumentation, Design.) (*Circuit testers, Printed circuits, *Electronic circuits, Tuned amplifiers, Preamplifiers, Signal-to-noise ratio, Test equipment, Tests.) (Field wire communication systems, Sidebands, Signal generators, *Phase shifters, Broadband, Modulators, Hall effect.) Electrical properties, Determination.

Research continued on the instrumentation and measurement techniques study. A current probe for use with printed circuitry which senses branch currents in parallel circuits and operates at a fixed frequency of 159 kc was successfully tested. The sensitivity is such that one milliampere in a conductor produces output from the associated amplifier. The noise equivalent input is about one microampere. The location of faults on loaded spiral-four cable by means of a phase measurement technique is evaluated experimentally. Agreement with predicted results is not sufficient to yield accurate results, however, there is evidence that the same procedure in conjunction with empirical data from lines in good operating condition would produce results with adequate accuracy. The theory and operation of a wideband 90 degree phase shifter is discussed. This device uses Hall-element product modulators and should be capable of minimizing intermodulation distortion in SSB equipment. (Author)

AD-274 298 Div. 30
(TISTP/FR) OTS price $8.60

Army Signal Research and Development Lab., Fort Monmouth, N. J.
SOLAR RADIATION MEASUREMENT INSTRUMENTATION,
by Reinhold M. Marchgraber and Ralph W. Armstrong. Jan 62, 89p. incl. illus. tables (ASRDL technical rept. no. 2251)
Unclassified report

DESCRIPTORS: (*Radiometers, Sun, Atmosphere, Heat.) (*Thermocouples, Silver wire, Bismuth wire.) Varnishes, *Recording devices, Solar spectrum.

A pyranometer for measuring sun and sky radiation on a horizontal surface in selected broad spectral bands was developed. A thermoelectric-type sensor was modified to permit use of hemispheric glass filters of practical size. Desired spectral bands can be selected by using two or more units with differing sharp cut-offs on the ultraviolet side of their pass bands but nearly identical transmission limits on the infrared side; and subtracting the output of the narrower bands from the longer. The new equipment is described and its design philosophy and performance are discussed. A mount providing for altitude and azimuth adjustments, and provision for as many as three different hemispheric filters on each sensing unit, make the equipment suitable for a variety of applications. (Author)

AD-274 325 Div. 30, 7
(TISTM/BRW) OTS price $1.50

National Aeronautics and Space Administration, Washington, D. C.
ELECTRODE CONFIGURATIONS FOR A WIND-TUNNEL HEATER INCORPORATING THE MAGNETICALLY SPUN ELECTRIC ARC,
by Donald R. Boldman, Charles E. Shepard, and John C. Fakan. Apr 62, 51p. incl. illus. 13 refs. (Technical note D-1222)
Unclassified report

Also available from NASA, Wash. 25, D. C., as NASA Technical note D-1222.

DESCRIPTORS: (*Hypersonic wind tunnels, *Heaters, Electric arcs, Magnetic fields, *Electrodes, Configuration, Cathodes of Tungsten alloys, Thorium alloys, Copper electrodes, Copper, Anodes.) (Test facilities, Re-entry aerodynamics, Aerodynamic heating, Simulation, Gas flow, Electric potential, Pressure.)

Various magnetically spun arc heater configurations were tested over a range of N flow rates, power levels, and pressures. Results of an evaluation of an arc heater composed of a 0.75-in. thoriated-W cathode, a cylindrical Cu anode,

and a magnetic-field coil are presented. A study to determine the independent effect of pressure on arc potential difference, heater efficiency, and stagnation enthalpy was conducted with this unit using a series of nozzles with throat diameters of 0.5, 0.25, and 0.125 in. The arc potential difference was essentially independent of the pressure level except for any change in the operating mode. A change in the arc operating mode resulting in transition to a higher arc potential difference was observed between the flow rates of 0.0055 and 0.0075 lb/sec using the 0.25-in.-throat-diam nozzle. The highest values of stagnation enthalpy and arc heater efficiency were obtained at the conditions corresponding to the highest arc potential difference. (Author)

AD-274 350 Div. 30
(TISTP/TL) OTS price $2.60

David Taylor Model Basin, Washington, D. C.
A SCIENTIFIC EVALUATION OF A REAL TIME DATA PROCESSING SYSTEM,
by Donn J. Prendergast and Robert E. Dalton.
Jan 62, 29p. incl. tables, 6 refs. (Rept. no. 1557)

Unclassified report

DESCRIPTORS: (*Data processing systems, Effectiveness, *Reliability.) (*Statistical processes, *Time, Probability.)

The purpose of this analysis is to permit management to quickly and inexpensively evaluate a real time data processing system and to express a statistical confidence in the validity of their evaluation. (Author)

31. SHIPS AND MARINE EQUIPMENT

No Entries

32. MISCELLANEOUS ARTS AND SCIENCES

AD-274 253 Div. 32
(TISTE/CDM) OTS price $4.60

Lincoln Lab., Mass. Inst. of Tech., Lexington.
UNCLASSIFIED PUBLICATIONS OF LINCOLN LABORATORY.
15 Apr 62, 42p. (Suppl. no. 1 to AD-264 714)
(Contract AF 19(604)7400)
(AFESD TDR 62-74)

Unclassified report

DESCRIPTORS: (*Reports, Scientific reports, Conferences, *Translations, Periodicals, *Bibliography.) (*Scientific research, Military research, Electronics, Radar, Radio, Communication systems, Computers.)

AD-274 358 Div. 32, 4
(TISTM/EJH) OTS price $3.60

American Chemical Society, Wahington, D. C.
THE DETECTION AND ORIENTATION OF SUBSTRUCTURES IN ORGANIC COMPOUNDS.
Rept. no. 1 on Program NSF,
by G. Malcolm Dyson. Feb 62, 37p. incl. illus. tables.
(NSF Grants 10339 and 16849)

Unclassified report

DESCRIPTORS: (*Organic compounds, Monocyclic compounds, Polycyclic compounds, Information theory, *Coding, Computers, *Data storage systems, Documentation.) *Molecular structure.

In developing a general system for the orientation of chemical knowledge, it was considered axiomatic that all available data should be related to a system and that the permutative and combinative selection offered in retrieval should be of infinite depth. One problem was the identification of sub-structures in organic compounds. In practical terms this may amount to answering one or more of the following questions: (1) What compounds contain a specific element, (2) What compounds contain a specific group, and (3) Are a given number of such atoms or groups or combinations of atoms or groups present. Still higher degrees of data sophistication are possible with ring compounds. Algorithms based on the use of the official IUPAC notation were devised. By combining certain algorithms and moving from one to another as searching landmarks determine, it is possible to answer any question - no matter how sophisticated - on the structures of compounds, both cyclic and acyclic, either individually or generically. (Author)

33. TRANSPORTATION

No Entries

NON-MILITARY AND OLDER MILITARY RESEARCH REPORTS

Division 31-SHIPS AND MARINE EQUIPMENT

Division 32-MISCELLANEOUS ARTS AND SCIENCES

Division 33-TRANSPORTATION

NON-MILITARY AND OLDER MILITARY RESEARCH REPORTS

*Descriptors marked with an asterisk are included in the subject index.

BIBLIOGRAPHY

PB 159 941 $5.60

Applied Physics Lab., Johns Hopkins U., Silver Spring, Md.
GUIDE TO THE LITERATURE OF ENGINEERING, MATHEMATICS AND THE PHYSICAL SCIENCES, by Sylvia Goldman. Rept. on Contract NOrd-7386. Sep 59, 57p. 600 refs. Rept. no. TG 334-1.

DESCRIPTORS: *Engineering, *Mathematics, *Physics, Literature, *Periodicals, *Bibliography, Aeronautics, Astronautics, Astronomy, Astrophysics, Geophysics, Chemical engineering, Chemistry, Electronics, Electrical engineering, Acoustics, Mechanical engineering, Applied mechanics, Mechanics, Algebra, Measurement, Instrumentation, Differential equations, Elasticity, Plasticity, Electricity, Heat transfer, Information theory, Operations research, Optics, Probability, Quantum mechanics, Relativity theory, Thermodynamics, Solid state physics, Vector analysis, Wave analysis, Automation, Interior ballistics, Handbooks, Textbooks, Numerical analysis, Fluid mechanics.

The basic objective of this report is to provide a reasonably current, selective bibliography of abstracting journals, reference journals, reference texts and monographs in areas of science and engineering which are of frequent interest to APL personnel.

CNLM-1802-10 $1.10

Pratt and Whitney Aircraft Div., United Aircraft Corp., Middletown, Conn.
SELF-SHIELDING CROSS SECTIONS. A bibliography, comp. by E. A. Cernak. 29 Dec 59, 7p. 37 refs.

BEHAVIORAL SCIENCES

TID-14314 $0.50

Bureau of Labor Statistics, Dept. of Labor, Washington, D. C.
EMPLOYMENT OPPORTUNITIES IN THE ATOMIC ENERGY FIELD. Apr 62, 52p. 23 refs.

Psychology

PB 159 951 $1.60

Army Medical Research Lab., Fort Knox, Ky.
PERCEPTION OF RELATIVE FREQUENCY AS A FUNCTION OF THE NUMBER OF RESPONSE CATEGORIES, by R. A. Gardner. Rept. on Psychophysiological Studies. 16 Dec 59, 16p. 11 refs. Rept. no. 408; AD-231 075.

DESCRIPTORS: *Behavior, Perception, Test methods, *Reaction (Psychology) Statistical analysis, Tests, *Learning, *Reasoning, Conditioned reflex.

Choice behavior in an uncertain situation where the only basis for choice was the perceived relative frequency of events in a series was studied. The number of available response categories, or choices, was varied independently of the number of stimulus-event categories in the series. This was accomplished by adding dummy-choices, choices that could not result in hits, on the response panels. In general, increasing the number of response categories by the dummy-choice method tended to increase the response bias in favor of the most frequently presented category, but this result was difficult to interpret because of the rapid extinction of the dummy choices. There was a significant relationship between the number of dummy-choices on the response panel and the rate of extinction, the greater the number of dummy-choices the more rapid the extinction. This suggests an interpretation of the multiple-choice effect in decision making in terms of the extinction of the less frequently hit choices. (See also PB 144 221)

AD-273 511 repriced $1.25

Lockheed-Georgia Co., Marietta.
HUMAN PERFORMANCE AS A FUNCTION OF THE WORK-REST RATIO DURING PROLONGED CONFINEMENT, by Oscar S. Adams and W. Dean Chiles (Aerospace Medical Lab.). Rept. on Training, Personnel and Psychological Stress Aspects of Bioastronautics, Contract AF 33(616)7607. Nov 61, 47p. 5 refs. ASD Technical rept. 61-270.

DESCRIPTORS: Strategic air command, Combat, Personnel, Aviation personnel, Training, *Human engineering, Space environmental conditions, *Stresses (Psychology), Physiology, Psychology, Space medicine, Astronautics, Feasibility studies.

The purpose of this study was to investigate the feasibility of using a 4-hours-on-duty and 2-hours-off-duty schedule in the operation of advanced aerospace systems. Two B-52 combat ready crews were confined for 15 days in a simulated advanced system crew compartment and were tested with a battery of five performance tasks and four psychophysiological measures. Data obtained during two 15-day testing periods are summarized in the main body of this report. Additional performance data obtained from five studies using college student subjects are presented in appended sections of this report. These results are based on four 96-hour investigations (two with a 4-on and 2-off schedule and two with a 6-on and 2-off schedule) and one 120-hour control group study (4 hours per day, 5 days per week, for 6 weeks). With proper control of selection and motivational factors, crews can work effectively for periods of at least two weeks and possibly longer using a 4-on and 2-off work-rest schedule. (Author)

BIOLOGICAL SCIENCES

PB 159 924 $1.10

Battelle Memorial Inst., Columbus, Ohio.
FACTORS AFFECTING THE COMPATIBILITY OF BLOOD WITH PLASTICS, by R. E. Beck and R. I. Leininger. Invention. Rept. on Contract SA-43-ph-3086. [1961] 1p.

DESCRIPTORS: Gamma radiation, *Plastics, Surface properties, Polymers, Radiation effects, Acrylic resins, Wetting agents, *Blood, Silanes, Pyrrolidinones.

Radiation grafting was carried out to modify the surface properties of several plastics. In the course of this phase of the study, certain polymers and copolymers were grafted by means of radiation onto the surface of silicone rubber. In one instance, silicone rubber in contact with a hydrophilic gel-producing monomer solution, such as a 1:1 molar solution of methyl methacrylate and N-vinyl-2-pyrrolidone, was subjected to gamma irradiation. The grafted material was a 1:1 copolymer of methylmethacrylate and n-vinyl-2-pyrrolidone. This copolymer in itself is very wettable and when grafted onto the silicone surface produced a hydrophilic surface. Untreated silicone is definitely hydrophobic in nature. This finding may have application wherein it is desired to use adhesives with silicones or where printing on silicone surfaces is desired. (Report quoted in entirety)

TID-15142 $3.60

Rockefeller Inst. for Medical Research, New York.
THE PURIFICATION AND PROPERTIES OF RIBOSOMES FROM THE THYMUS NUCLEUS, by A. O. Pogo, M. G. Hamilton and others. Rept. on Contract AT(30-1)-910. [1961] 34p. Prepared in cooperation with Sloan-Kettering Inst. for Cancer Research, New York.

Radiobiology

NYO-10057 $1.10

Albert Einstein Medical Center, Philadelphia, Pa.
THE UPTAKE OF RADIOACTIVE PHOSPHORUS(P^{32}) BY THE PROSTATE GLAND. Final rept. on Contract AT(30-1)-2405. 18 Jan 62, 10p. 12 refs.

UCLA-502 $2.60

California U., Los Angeles. School of Medicine.
HIPPURAN I^{131} RENOCYSTOGAM. NEW TECHNIQUES, INTERPRETATIONS AND EXPERIENCES, by G. V. Taplin, E. D. Dore, and D. E. Johnson. Rept. on Contract AT(04-1)-gen-12. Feb 62, 29p. 14 refs.

TID-15045 $1.10

California U., Los Angeles. School of Medicine.
ZINC IN BONE, by George V. Alexander and R. E. Nusbaum. Rept. on Contract AT(04-1)-GEN-12. 12 Dec 61, 7p.

TID-14373 $3.60

Eltex Research Corp., Providence, R. I.
THE DEVELOPMENT OF CHELATING AGENTS FOR ENHANCING THE URINARY EXCRETION OF STRONTIUM, by Harry Kroll, Kenneth Wunschel, and Thomas Wolf. Annual rept. 1 Feb-30 Nov 61, on Contract AT(30-1)-2710. 7 Dec 61, 34p.

HW-72511 $0.50

Hanford Atomic Products Operation, Richland, Wash.
METABOLISM AND DOSIMETRY OF CESIUM-137 IN MALE SHEEP, by R. O. McClellan, J. R. McKenney, and L. K. Bustad. Rept. on Contract AT(45-1)-1350. Feb 62, 13p. 9 refs.

AD-261 875 $3.60

Naval Radiological Defense Lab., San Francisco, Calif.
A BIBLIOGRAPHY OF BIOLOGICAL APPLICATIONS OF AUTORADIOGRAPHY 1 JULY 1959 TO 1 JANUARY 1961, by M. E. Johnston, 28 July 61, 38p. 500 refs. Reviews and Lectures no. 117.

DESCRIPTORS: *Bibliography, Biology, *Autoradiography, Radiation effects, Tissues (Biology) *Medical research.

This bibliography is a continuation of those previously compiled and published as University of California Radiation Laboratory Reports #8400 and #8901.

CHEMISTRY

HW-60533 $1.10

Hanford Atomic Products Operation, Richland, Wash.
MEASUREMENT OF THE NUCLEAR MATERIALS CONTENT OF NON-PRODUCTION FUELS, by R. A. Schneider. Rept. on Contract AT(45-1)-1350. 25 May 59, 9p.

TID-15149 $1.60

Indiana U., Bloomington.
A COMPARISON OF TRITIUM AND DEUTERIUM ISOTOPE RATE AND ARRHENIUS PARAMETER EFFECTS, by V. J. Shiner, Jr. Interim rept. 15 Mar 61-1 Mar 62, on Contract AT(11-1)-1008. [1962] 15p.

NLCO-844 $0.50

National Lead Co. of Ohio, Cincinnati.
CORRELATION OF THE ACID CONSUMPTION VALUE WITH THE URANIUM CONTENT OF ORE CONCENTRATES, by E. A. Andrew, A. J. Klee and others. Rept. on Contract AT(30-1)-1156. 4 Apr 62, 18p. 2 refs.

ORNL-TM-183 $1.10

Oak Ridge National Lab., Tenn.
SYNTHESES OF SOME ALKALI-METAL p-ETHYLBENZENESULFONATES, by J. C. White and H. L. Holsopple. 30 Mar 62, 9p. 5 refs.

DP-706 $0.50

Savannah River Lab., Aiken, S. C.
PROCESSING OF POWER REACTOR FUELS, comp. by F. G. Rust. Quarterly progress rept. no. 16, 1 July-1 Oct 61, on Contract AT(07-2)-1. Feb 62, 24p. 14 refs.

PB 159 929 $7.60

Washington U. [Seattle].
THE ROLE OF ADSORPTION IN HETEROGENEOUS CATALYTIC REACTIONS, by Lennart N. Johanson. Final rept. (including Technical rept. nos. 3-5), on Contract DA 04-200-ORD-667. 20 Dec 59, 80p. 52 refs. Rept. no. 1154.8-C; AD-231 758.

DESCRIPTORS: *Adsorption, *Molecular association, *Catalysis, *Chemical reactions, Ethylenes, *Oxidation, Ion exchange resins, Catalysts, Vapors, Ethanols, Ethers, Ethyl radicals.

Included in the report are:
Molecular association in the vapor phase system acetic acid, ethyl alcohol, ethyl acetate, and water, Technical rept. no. 3, pub. in The Trend in Engineering 11:22-27, July 59.
Reaction rate studies of the catalytic oxidation of ethylene, Technical rept. no. 4.
Ion exchange resins as vapor phase catalysts, Technical rept. no. 5.

EARTH SCIENCES

PB 159 915 $16.50

Army [Cold Regions Research and Engineering Lab.] Wilmette, Ill.
BIBLIOGRAPHY ON SNOW, ICE AND PERMAFROST WITH ABSTRACTS. Jan 61, 251p. 1,000 refs. SIPRE rept. 12, Volume 15.

DESCRIPTORS: *Bibliography, *Snow, *Ice, *Permafrost, Glaciers, Avalanches, Arctic regions, Antarctic regions, Greenland, USSR, Geography, Trafficability, Soils, Lakes, Inland waterways, Roads, Construction, Foundations, Structures, Buildings, Airplanes, De-icing systems, Transportation, Meteorology, Maps.

Includes principally the literature of 1960.

TEI-806 $4.60

Geological Survey, Washington, D. C.
INTERIM GEOLOGICAL INVESTIGATIONS IN THE U12e.03a AND U12e03b TUNNELS, NEVADA TEST SITE, NYE COUNTY, NEVADA, by W. L. Emerick and D. D. Dickey. Mar 62, 49p. Includes section on GAMMA RADIOACTIVITY SURVEY OF U12e03a TUNNEL, by C. M. Bunker.

PB 159 948 $16.00

Institute of Engineering Research, U. of California, Berkeley.
AMPHIBIOUS OCEANOGRAPHIC STUDIES FOR THE PERIOD OF 1 JANUARY 1949 TO 31 DECEMBER 1950. Summary rept. on Contract N7onr-295(19). Feb 51, declassified 12 Dec 57. 241p. 22 refs. Technical rept. no. HE-155-45; Series no. 29, issue no. 45; ATI-129 111.

DESCRIPTORS: *Amphibious operations, *Oceanography, Oceanographical data, Beaches, Water waves, Climate, Meteorology, Weather forecasting, Trafficability, Aerial photography, Oceanographic vessels, Amphibious vehicles, Landing, Geography, Hydrology, Mathematical prediction, Personnel, Safety, Training.

The objective of the investigations was to evaluate the various immediate factors of beach and surf conditions as limiting the operation of amphibious craft and extending the evaluation of these factors to ascertain the important oceanographic, geormorphic and meteorological features which give rise to beach forms and surf conditions of concern to amphibious operation. The principle missions of the project were: to produce information that would be of value during the movement to the objective area and the landing and assault phases of an amphibious operation; to develop techniques for forecasting waves and surf of concern to landing operations; to produce information which would aid to the training of operating personnel of landing and amphibious vehicular craft; and to produce information that would advance the safety of personnel engaged in amphibious training exercises by establishing conditional limitations within which amphibious landing craft may operate safely.

SC-4667(RR) $0.75

Sandia Corp., Albuquerque, N. Mex.
NEW ALUMINUM OXIDE HUMIDITY ELEMENT, by C. M. Stover. Mar 62, 28p. 25 refs.

Physics of the Atmosphere

PB 159 934 $1.60

Naval Research Lab., Washington, D. C.
ON THE NATURAL RADIOACTIVITY IN THE AIR, by Irving H. Blifford, Luther B. Lockhart, Jr., and Herbert B. Rosenstock. Interim rept. 16 Sep 52, 13p. 11 refs. NRL rept. 4036.

DESCRIPTORS: *Radioactivity, Detection, Measurement, Air, *Atmosphere.

The concentrations of the various radiaoctive decay products of radium in the air have been determined by observing the beta activity of pieces of filter paper through which air has been passed, and of chemically separated isotopes obtained from such filter papers. The relative amounts of long-lived and short-lived products found indicate that besides the radioactive decay of the substances, some other process which removes radioactive particles from the air is active. The mean life of the particles with respect to this other removing process is found to be about ten days. The hypothesis that this process is the capture of the radioactive particles by rain droplets (clouds) is consistent with measurements made of the radioactive content of rainwater. On the other hand, the removal of the ionized radioactive particles by the electric field of the earth leads to a much smaller effect. (Author)

NYO-9853 $8.10

Parametrics, Inc., Saxonville, Mass.
INVESTIGATION OF RADIOISOTOPE TECHNIQUES FOR ATMOSPHERIC DENSITY MEASUREMENTS AND THE DEVELOPMENT OF A DEVICE. Task summary rept. on phase 1, June - December 1961, on Contract AT(30-1)-2795. 30 Jan 62, 81p.

ENGINEERING

PB 159 141 $15.50

Massachusetts Inst. of Tech., Cambridge.
DESIGN OF ALUMINUM DECKHOUSE STRUCTURES FOR NUCLEAR BLAST, by P. C. Yang, J. A. O'Brien, and J. M. Shah. Rept. on Contract NObs-84307. Aug 61, 240p. 34 refs.

DESCRIPTORS: *Naval vessels, *Ship decks, Aluminum, *Structures, Design, Load distribution, Ship bulkheads, Beams, Roofs, Girders, Membranes, Ship plates, Statics, Pressure, Nuclear weapons, Blast.

In order to develop structural design procedures for naval deckhouses subjected to the effects of nuclear weapons, all elements of the structure are included but the region of consideration does not extend below the main deck. Structural details, connections, etc. are not considered since the problems involved are essentially the same as those encountered in conventional design.

SCTM-362-61(73) $1.00

Sandia Corp., Albuquerque, N. Mex.
REDUCTION OF STRAIN GAGE DATA, by P. H. Adams and R. C. Dove. Apr 62, 43p. 11 refs.

Aeronautical Engineering

PB 157 791 $3.60

Aviation Armament Lab., Naval Air Development Center, Johnsville, Pa.
TRANSISTOR APPLICATION TO ARMAMENT CONTROL SYSTEM AERO 5A, by Alfred L. Reich. 15 June 53, declassified 3 June 58. 37p. 4 refs. Rept. no. NADC-AR-M5313; TED Proj. ADC-AR-6032.

DESCRIPTORS: Armament, *Control systems, Airborne, *Radar equipment, *Range finding, *Transistors, Radar ranges, Servomechanisms, *Servo amplifiers, Amplifiers, Design, Circuits, Installation, Power supplies, Operation, Tests.

The prototype transistor servo combines, in one unit, the functions of Servo, Radar Range Aero 1A, Units I and II, and Radar Control Box C-637/APG-30. It has a volume of only 15% and a weight of 30% of the equipment which it replaces. The prototype is designed for console mounting in the cockpit and occupies a panel space equivalent to that of Radar Control Box C-637/APG-30. The basic circuitry of the transistor servoamplifier consists of three cascade stages of point-contact transistors in a chopper-type d-c amplifier circuit. This type of circuit eliminates detrimental effects of changes in the d-c characteristics of transistors due to temperature changes; supply-voltage changes, and aging. Inverse feedback is used both to stabilize and to adjust the amplifier gain. The evaluation results show that the transistor servo is capable of satisfactory operation over an altitude range of sea level to 50,000 feet, and over a temperature range of -55°C to +50°C.

DC-59-12-123 $1.60

General Electric Co., Cincinnati, Ohio.
MAGNETIC LOGIC DEVICES, by John L. Scharf. Rept. on Contract AT(11-1)-171. 14 Dec 59, 21p.

PB 159 945-3 $16.00

Technical Operations, Inc., Washington, D.C.
APPLICATIONS, DERIVATIONS, AND DATA OF ATC SYSTEMS CONFIGURATION STUDY, by Cornelius F. Day, James C. Hodder, and others. Final rept. v. 3, on Contract FAA/BRD-331. 30 Dec 61, 245p. 12 refs. Technical rept. TO-W61-4.

DESCRIPTORS: *Air traffic control systems, Configuration, Design, Operation, Cost, Data processing systems.

The volume contains the basic source data, the derivation of quantitative relationships, and their combinations into the methodology applied in the Study. The major systems cost areas of Decision Making (Personnel, Displays, Switchgear, Housing), Data Transfer (Communications), Data Acquisition, and Data Processing are developed and integrated to yield a cost trade-off model. Methodology developed includes cost optimization of systems configurations, and a single-valued intersystems cost comparison. A Center Area Boundary Study (CABS) and its findings and configuration, as well as a PATHFINDER review are included: (Author)

PB 159 945-2 $3.60

Technical Operations, Inc., Washington, D. C.
COST PROCEDURES MANUAL ATC SYSTEMS CONFIGURATION STUDY, by Cornelius F. Day, James C. Hodder and others. Final rept. v. 2, on Contract FAA/BRD-331. 30 Dec 61, 40p. 6 refs. Technical rept. TO-W61-4.

DESCRIPTORS: *Air traffic control systems, Configuration, Costs, Instruction manuals.

The volume provides a guide, in the form of a prototype, to generalized systems costing procedures, formulas, and work sheets required in the making of a detailed air traffic control systems cost evaluation. (Author)

PB 159 945-1 $3.60

Technical Operations, Inc., Washington, D. C.
MANAGEMENT REPORT OF ATC SYSTEMS CONFIGURATION STUDY, by Cornelius F. Day, James C. Hodder and others. Final rept. v. 1, on Contract FAA/BRD-331. 30 Dec 61, 40p. 12 refs. Technical rept. TO-W61-4.

DESCRIPTORS: *Air traffic control systems, Configuration, Design, Cost, Management engineering.

This volume is a summary version of the three-volume report. Study objectives are detailed; methodological results are briefly summarized. Results of application of the methodology to specific air traffic control systems are presented in the form of numbers of air route traffic control centers, appropriate center-area boundaries, and an intersystem comparison of initial and annual operating costs. (Author)

ORNL-TM-35 $2.60

Oak Ridge National Lab., Tenn.
CHEMICAL TECHNOLOGY DIVISION UNIT OPERATIONS SECTION MONTHLY PROGRESS REPORT, JULY 1961, by M. E. Whatley, P. A. Hass and others. 30 Jan 62, 56p. 6 refs.

ORNL-TM-65 $8.60

Oak Ridge National Lab., Tenn.
UNIT OPERATIONS SECTION MONTHLY PROGRESS REPORT, AUGUST 1961, by M. E. Whatley, P. A. Hass and others. 1 Mar 62, 95p. 8 refs.

IDO-14579 $0.50

Phillips Petroleum Co., Idaho Falls.
SALT PHASE CHLORINATION OF REACTOR FUELS. IV. NIOBIUM BEHAVIOR IN THE LEAD CHLORIDE AND CHLORINE-LEAD CHLORIDE SYSTEMS, by J. L. Teague, H. T. Hahn, and E. M. Vander Wall. Rept. on Contract AT(10-1)-205. 15 Mar 62, 18p. 6 refs.

DP-702 $0.50

Savannah River Lab., Aiken, S. C.
DISSOLUTION OF Pu-Al ALLOY, by W. C. Perkins. Rept. on Contract AT(07-2)-1. Mar 62, 11p. 6 refs.

CVNA-135 $9.60

Westinghouse Electric Corp., Pittsburgh, Pa.
INORGANIC ION-EXCHANGER MATERIALS FOR WATER PURIFICATION IN CVTR, by N. Michael, W. D. Fletcher and others. Aug 61, 109p. 29 refs.

Electrical and Electronic Engineering

AD-273 192 $5.00

ARINC Research Corp., Washington, D. C.
RELIABILITY OF SEMICONDUCTOR DEVICES, by William H. von Alven and George J. Blakemore, Jr. Final rept. on Contract NObsr-81304. 22 Dec 61, 361p. 76 refs. Publication no. 144-6-270.

DESCRIPTORS: *Semiconductors, *Reliability, Life expectancy, Failure (Mechanics), Specifications, Sampling, Electronic equipment, Transistors, Diodes, Quality control.

A summation is given of the main findings on: field reliability of semiconductor devices; analysis of life-test

data; means for reducing failure rates; engineering requirements for the development of specifications; sampling procedures; and application data for MIL-STD-701B devices.

NAA-SR-MEMO-2295 $1.10

Atomics International, Canoga Park, Calif.
IONIZATION CHAMBER RESPONSE FOR KEWB PILE OSCILLATOR EXPERIMENTS, by M. Huntsinger. Rept. on Contract AT(11-1)-Gen-8. 7 Nov 57, 7p.

PB 159 921 $2.60

Columbia Radiation Lab., Columbia U., New York.
RESEARCH INVESTIGATION DIRECTED TOWARD EXTENDING THE USEFUL RANGE OF THE ELECTROMAGNETIC SPECTRUM, by P. Kusch. Quarterly progress rept. no. 4, 16 Sep-15 Dec 58, on Contracts DA 36-039-sc-73279, AF 18(600)1334, and Nonr-266(45). 15 Dec 58, 30p. Rept. no. CU-4-58 SC-73279.

DESCRIPTORS: *Magnetrons, *Microwave spectroscopy, Cerenkov radiation, Microwave equipment, *Molecular beams, Hyperfine structure, Atoms, Gases, Microwave amplifiers, Microwave networks, *Masers

A continuation of magnetron studies is reported. It is shown that harmonic generation occurs in low field as well as high field operation. Progress in radio-astronomic measurements with use of maser amplifiers is described. The status of work on a 21 cm maser amplifier which has been successfully operated is outlined and preliminary experiments leading to the development of an infrared maser are described. Several new techniques in microwave measurements are reported. Spectroscopic studies of free radicals, stable molecules, atomic tritium by the techniques of microwave spectroscopy, molecular beams and masers are reported. Studies of the properties of gases at high temperatures by the velocity selector method are being continued. (Author) (See also PB 150 166)

PB 159 920 $6.60

Columbia Radiation Lab., Columbia U., New York.
RESEARCH INVESTIGATION DIRECTED TOWARD EXTENDING THE USEFUL RANGE OF THE ELECTROMAGNETIC SPECTRUM, by P. Kusch. Quarterly progress rept. no. 7, 16 June-15 Sep 59, on Contracts DA 36-039-sc-73279, AF 18(600)1334, and Nonr-266(45). 15 Sep 59, 62p. 13 refs. Rept. no. CU-9-59 SC-73279.

DESCRIPTORS: *Magnetrons, *Microwave spectroscopy, Cerenkov radiation, Microwave equipment, *Molecular beams, Hyperfine structure, Atoms, Gases, Microwave amplifiers, Microwave networks, *Masers.

The inauguration of a new series of experiments on harmonic generation in magnetrons, with the ultimate hope of magnetron generation of power in a previously unattainable frequency range is reported. Progress in other magnetron work is also described. A detailed discussion of several major maser projects is given; in particular the results of radioastronomic measurements with the use of maser amplifiers are reported. The conclusions of a detailed study of the properties of sources for gas masers are presented. A detailed theoretical and experimental study of microwave resonators made of high dielectric materials is described; it appears that such resonators may have important applications. A number of projects dealing with spectroscopy by the methods of microwave spectroscopy and atomic beams are described. Progress in studies of various properties of atomic and molecular systems is reported. (Author) (See also PB 159 921)

PB 159 916 $9.10

Electronic Defense Labs., Mountain View, Calif.
MATHEMATICAL MODELS FOR SYSTEM RELIABILITY, by Richard E. Barlow and Larry C. Hunter. Rept. on Contract DA 36-039-sc-78281. 11 Aug 59, 110p. 9 refs. Engineering rept. no. EDL-E35; AD-228 131.

DESCRIPTORS: *Electronic systems, Reliability, Applied mathematics, Integral equations, Probability, Quality control.

A workable method is presented for determining the reliability of large, complex systems. Repair is an integral part of the model proposed and the usual assumption of component independence is not made. Recognizing the stochastic nature of the time between failures in an electronic system, the reliability of any system is defined in terms of a suitable stochastic process. If component failure and repair parameters are known, the reliability of the system can be calculated easily. Conversely, for a known reliability requirement for the system, determination of permissible values for the mean time-to-repair and the mean time-to-failure of each component is a routine matter. Certain specific applications of the generalized concepts are included: (a) a reliability analysis is made of a less complex system (redundant circuits), each of whose components may fail in one of two ways; (b) to investigate the repair feature of the model more fully, 2 types of preventive maintenance policies are considered; and (c) a related problem, that of optimal checking procedures, is solved for a class of failure distributions. (Author)

DC-58-4-128 $6.60

General Electric Co., Cincinnati, Ohio.
APPLICATION OF IBM 650 COMPUTER TO SERVO ANALYSIS, by J. W. Ryan. Rept. on Contract AT(11-1)-171. 17 Apr 58, 70p.

DC-58-5-179 $2.60

General Electric Co., Cincinnati, Ohio.
RADIATION EFFECTS ON ELECTRONIC EQUIPMENT, by John R. Crittenden. Rept. on Contract AT(11-1)-171. 23 May 58, 23p.

PB 159 953 $16.00

Hughes Aircraft Co., Culver City, Calif.
PHONE LINE DIGITAL TRANSMISSION STUDY. Rept. on Contract AF 30(603)1954. Sep 60, 249p. 108 refs. RADC-TR-60-153; AD-244 193.

DESCRIPTORS: Data transmission systems, Circuits, Analysis, Errors, Mathematical analysis, *Telephone communication systems, Bibliography, Digital systems, *Communication systems, Coding, Noise (Radio)

An experimental and theoretical study program was undertaken to determine the characteristics of wire-line circuits and equipments and their joint capability for supporting data transmission. Initially, the transmission characteristics of a variety of basic circuits and their combinations are detailed in terms of their attenuation-frequency response and their envelope delay-frequency response. The merits of equalization are considered. Deleterious characteristics of the various circuits are then investigated. Frequency stability, gain stability, compandor effects, echo, crosstalk and noise, and impulse noise, and impulse noise are considered in turn. The subject of modulation (and data modems) is discussed and relative performance evaluated. The subject of error control by means of coding techniques is treated, and a representative transmission problem discussed to demonstrate application of such techniques. Lastly, the economic aspects of a sample facility are considered in some detail. (Author)

UCRL-10009 $0.75

Lawrence Radiation Lab., U. of California, Berkeley.
AN INTEGRAL DESIGN TECHNIQUE FOR WIDE-BAND MULTISTAGE TRANSISTOR AMPLIFIERS, by Larry Scott. Rept. on Contract W-7405-eng-48. 14 Dec 61, 28p. 4 refs.

MND-P-3017-I $0.50

Martin Marietta Corp., Baltimore, Md.
SNAP RADIOISOTOPE SPACE PROGRAMS. Quarterly progress rept. no. 9, Task 7, 1 Oct-31 Dec 61, on Contract AT(30-3)-217. May 62, 17p. 7 refs.

PB 159 936 $4.60

Navy Electronics Lab., San Diego, Calif.
A METHOD OF PREDICTING SONAR EFFECTIVENESS, by P. J. Himes, R. L. Mador, and B. W. Porter. Rept. on Develop Methods and Techniques Suitable for Studying the Performance of Sonar Systems. 15 July 52, declassified 16 June 61, 41p. 26 refs. Rept. 312.

DESCRIPTORS: *Sonar, Sonar equipment, *Echo ranging, Submarines, Detection, Numerical methods and procedures, Underwater object locators, Naval research laboratories

Based on a study of the parameters affecting echo-ranging search operations, a method was developed for the calculation of nine measures of sonar search effectiveness, including probability of detection by a screen and expected range of initial contact. Application of the method to QCS and QHB equipments showed that (a) appreciably greater ranges cannot be obtained by minor modifications of these equipments; (b) the probability of detecting a submarine by a screen of DE's spaced 3000 yards apart and equipped with either equipment is 0.5 in the North Atlantic. (Author)

OTS SB-447, Revised $0.10

Office of Technical Services, Dept. of Commerce, Washington, D. C.
FUEL CELLS AND RELATED RESEARCH. Dec 61, 9p. 122 refs. OTS Selective Bibliography SB-447, rev.

DESCRIPTORS: *Fuel cells, *Bibliography, Electrochemistry, Power, Temperature, Electrolytes, Materials, Hydrogen, Nitrogen compounds, Oxyfluorides, Solar cells, Electric propulsion

Lists 122 foreign and domestic references of fuel cells and research leading to development on fuel cells added to the OTS collection up to January 1, 1962. Includes reports on electrochemical power systems; low temperature and high temperature fuel cells; solid electrolytes for fuel cells; fossil fuels and other fuel cell materials; generation of hydrogen for fuel cell systems; nitrosyl chloride solar regenerative fuel cell systems among other subjects.

PB 181 302 $1.25

Radiation Effects Information Center, Columbus, Ohio.
THE EFFECT OF NUCLEAR RADIATION ON ELECTRON TUBES AND TUBE MATERIALS, by W. E. Chapin. Rept. on Contract AF 33(616)7375, continuation of Contract AF 33(616)6564. 15 Feb 61, 41p. 33 refs. REIC rept. no. 14; AD-252 607.

DESCRIPTORS: *Radiation damage, Gamma rays, *Electron tubes, *Miniature electron tubes, *Subminiature electron tubes, Thyratrons, Photomultipliers, Voltage regulator tubes, Triodes, Beam power tubes, Pentodes, Magnetrons, Traveling wave tubes, Photometers, Iconoscopes, Klystrons, Cathode ray tubes, Glass, Ceramic materials, Metals, *Glass seals, *Metal seals, Bibliography

The report concerns studies of radiation effects as reported for electron tubes and tube materials during the past 8-10 years. These studies indicate that the primary damage mechanism which limits prolonged use or storage of electron tubes in high-intensity fluxes is the failure of the glass envelope. Much has been written concerning failures in the glass-to-metal seals. These damages were observed at integrated neutron fluxes in the range of 10 to the 15th power to 10 to the 16th power (nv)t. for most borosilicate envelopes and Kovar seals. Boron-free glasses are more radiation resistant and can withstand integrated fluxes as high as 10 to the 18th power (nv)t. Tubes necessitating large glass envelopes are more prone to radiation damage. Miniature and sub-miniature tubes require smaller sealing areas and use less glass, thus enabling the tube to withstand prolonged exposures. (Author)

PB 155 560 $9.10

Sylvania Electric Products, Inc., Bayside, N. Y. DEVELOPMENT OF WIDEBAND OSCILLATOR TUBES, by J. A. Noland and R. E. Lepic. Final rept. on Contract DA 36-039-sc-56717. 15 July 57, 104p. 4 refs. Rept. no. YD-54-19-11: AD-218 865.

DESCRIPTORS: *Backward-wave oscillators, *Microwave oscillators, Oscillators, *Electron tubes, Electron guns, Design, Construction, Transducers, Helixes, Antennas, Traveling wave tubes.

This report discusses the design and construction of two experimental backward-wave oscillator tubes operating in the frequency ranges from 17 to 27 kMc and 26 to 41 kMc and having power outputs of the order of 10 and 2 milliwatts, respectively. Also described is a modified oscillator operating in the 15 to 24 kMc range with an output of the order of 10 milliwatts. These tubes, which require a solenoid magnetic field of 1000 gauss, employ tape helices and are voltage tunable over an approximate range of 500 to 2000 volts. The outputs are obtained from RG-53/U and RG-96/U antenna-excited waveguides. Construction features of these tubes include the use of a special fluted glass tubing as a helix support and pyrolytic carbon-coated ceramic rods as internal attenuators. Recommendations are made for a permanent-magnet focused tube and methods for obtaining improved microwave matches are discussed. Data for several possible modifications are reported, and constructional and processing techniques are described. (Author)

NAA-SR-6308 $6.60

Thompson Ramo Wooldridge, Inc., Cleveland, Ohio. 2500-HOUR ENDURANCE TEST OF MERCURY RANKINE CYCLE POWER SYSTEM, by Paul E. Grevstad. Snap II Power Conversion System Topical rept. no. 16 on Contract AT(11-1)-Gen-8. Jan 61, 64p. ER-4653.

Ordnance, Missiles, and Satellite Vehicles

PB 159 938 $5.60

Armour Research Foundation [Chicago, Ill.]. BLAST EFFECTS ON TUNNEL CONFIGURATIONS, by James J. Swatosh, Jr., and Roman Birukoff (Air Force Special Weapons Center). Final test rept. no. 17 on Blast Effects on Buildings and Structures and Protective Construction, Operation of Six-Foot and Two-Foot Shock Tubes, Contract AF 29(601)796. 1 Oct 59, 56p. ARF Proj. no. 4144; AFSWC-TR-59-48; AD-239 640.

DESCRIPTORS: *Underground structures, Model tests, Shock tubes, *Blast, Shock waves, Loading, *Test facilities, Configuration, Measurement, Atomic bomb explosions.

Pressure measurements were made in tunnel type models as a function of both geometric and free-stream blast wave parameters. The major axis of the tunnels subtended angles of 0, 45, and 90 degrees with the direction of free-stream blast flow. Pressure-time records (overpressure as a function of time measurements) were obtained at various positions within the tunnels. It was shown that the peak overpressure, only one and one-half diameters from the tunnel's entrance, was of the order of 30 to 50 percent of the free-stream overpressure for 90 degree tunnel orientations. For tunnel orientations of zero degrees, the peak overpressure just inside the tunnel's entrance is greater than the initial free-stream overpressure, but considerably smaller than reflected pressure existing in the vicinity of the tunnel entrance. Overpressure near the entrance of the tunnels varied with both the orientation of the tunnel and with the magnitude of the free-stream shock strength. The attenuation of pressure further down the tunnels was a function of distance from the entrance, tunnel orientation, and tunnel geometric complex. The influence of wall roughness on attenuation became less pronounced as the absolute tunnel diameter increased.

PB 159 950 $4.60

Frankford Arsenal, Philadelphia, Pa. STANDARDIZATION OF LEAD STYPHNATE PRIMING MIXTURES AND PROCESSES, by Reed E. Donnard and George R. Kilby. Rept. no. 6, on Lead Styphnate Crystal Study. Dec 57, 47p. 1 ref. Rept. no. R-1422; AD-162 400.

DESCRIPTORS: *Lead compounds, *Styphnates, *Primers, Standardization, Crystals, Nitrates, Solutions, Styphnic acid, Acids, Chemical reactions, Precipitation.

Patches of normal lead styphnate were precipitated using lead nitrate solutions of sequential concentrations. All other parameters attendant to the precipitation were held substantially constant. Magnified photographs were made of the crystals produced in each experimental patch. The crystals, shown on each photograph, were grouped, dimensionally, in a series of crystal diameter sub ranges within a total range of 0 to 112 microns. The percentage of crystals having diameters within the range of approximately 44 to 112 microns was determined for each sample and the sample having the largest percentage of crystals within this range was ascertained. (Maximum diameter in study - 112 microns) The concentration of load nitrate solution which produced the largest percentage of normal lead styphnate crystals having diameters within the range of approximately 44 microns to 112 microns was demonstrated to be 408 grams per liter (1.2 molal).

MND-P-2699(Vol. II) $11.50

Martin Marietta Corp., Baltimore, Md. UPPER ATMOSPHERE RE-ENTRY STUDY: HIGH ALTITUDE BURNUP VOLUME II. Rept. on Contract AT(30-3)-217. Apr 62, 156p. 50 refs.

PB 159 944 $19.75

Office of the Director of Defense Research and Engineering, Washington, D. C.
SHOCK, VIBRATION AND ASSOCIATED ENVIRONMENTS. PART III, by W. W. Mutch. Rept. on Symposium on Protective Construction and Hot War Environments. 1 Sep 60, 333p 181 refs. Bulletin no. 28.

DESCRIPTORS: *Military equipment, Design, Simulation, *Blast, Survival, *Underground structures, Loading, Model tests, Atomic bomb explosions, Shock waves, Vibration, Test facilities, Electronic equipment, Radioactive fall-out, Explosions, Stresses, Gages, Pressure gages, Air blast, Recording devices, Guided missiles, Shelters

SCDR-39-61 $2.60

Sandia Corp., Livermore, Calif.
TELEMETERING BY USE OF INDUCTION COUPLING BETWEEN TRANSMITTER AND RECEIVER (FEASIBILITY STUDY), by R. I. Peterson and P. A. Lux. Rept. on Contract AT(29-1)-789. Jan 62, 21p.

Sanitation and Safety Engineering

APAE-79(Suppl. 2) $8.10

Alco Products, Inc., Schenectady, N. Y.
HAZARDS REPORT FOR SM-1 CORE TEMPERATURE AND FLOW INSTRUMENTATION (TASK XIV) COVERING SPECIAL TEST PROCEDURES, by P. L. Bradley and J. R. Coombs. Rept. on Contract AT(30-1)-2639. 28 Feb 62, 81p.

LA-2671 $0.75

Los Alamos Scientific Lab., N. Mex.
A STUDY OF THE DIFFUSION AND MIXING OF TRITIUM GAS IN AIR, by Morris J. Engelke and Edwin A. Bemis, Jr. Rept. on Contract W-7405-eng-36. 12 Apr 62, 36p. 9 refs.

FOOD, HANDLING, AND PACKAGING EQUIPMENT

TID-13439 $3.50

Curtiss-Wright Corp., Princeton, N. J.
THE HIGH INTENSITY FOOD IRRADIATOR. Rept. no. 17 (final) on Contract AT(04-3)-200. 1 May 60, 263p. 12 refs.

MACHINERY, FABRICATION, AND ACCESSORY EQUIPMENT

TID-14962 $3.60

Laboratories for Research and Development, Franklin Inst., Philadelphia, Pa.
THE APPLICATION OF GAS-LUBRICATED BEARINGS TO HIGH-SPEED TURBO-MACHINERY, by M. W. Eusepi, A. Marmorou, and D. D. Fuller. Quarterly technical rept. FI-Q-A2392-3-3. 1 Sep-30 Nov 61, on Contract AT(30-1)-2512.

TID-15157 $1.60

Sandia Corp., Albuquerque, N. Mex.
THE DESIGN AND INSPECTION FACTORS THAT AFFECT SENSIBLE MANUFACTURING, by E. S. Roth. Rept. on Contract AT(20-1)-789. Feb 62, 9p.

Presented at ASTME Conference on "Sensible Manufacturing" at the University of Colorado, 3 Mar 62.

Engines and Propulsion Systems

NAA-SR-6476 $5.60

Atomics International, Canoga Park, Calif.
BEARING MATERIALS COMPATIBILITY FOR SPACE NUCLEAR AUXILIARY POWER SYSTEMS, by W. J. Kuzeka. Rept. on Contract AT(11-1)-Gen-8. 1 Sep 61, 60p.

DC-59-12-183 $1.60

General Electric Co., Cincinnati, Ohio.
DISCUSSION OF PERFORMANCE CALCULATIONS OF NUCLEAR ROCKET ENGINES, by Eleanor L. Semple. Rept. on Contract AT(11-1)-171. 21 Dec 59, 14p.

DC-59-12-28 $2.60

General Electric Co., Cincinnati, Ohio.
GEAR TYPE PNEUMATIC SERVO MOTOR COMBINED WITH A 4-WAY SERVO VALVE, by John R. Colston. Rept. on Contract AT(11-1)-171. Nov 59, 29p.

PB 159 917 $13.50

General Electric Co., Cincinnati, Ohio.
XM-731 PLASMA ENGINE RESEARCH AND DEVELOPMENT PROGRAM, by B. W. Harned, A. Sherman and others. Final rept. for 1 Mar 60-31 Jan 61, on Contract AF 33(616)7176. 31 Jan 61, 199p. 37 refs. WADD Technical rept. 60-895; AD-254 589.

DESCRIPTORS: *Plasma physics, Spaceships, *Propulsion, *Plasma jets, Electric fields, Magnetohydrodynamics, Magnetic fields, Magnetic drives, Electric propulsion, Design, Hall effect, Electrical conductance, Accelerators, Electrodes, Magnetic effect, Magnets, Specific impulse.

An experimental and theoretical program has been conducted to investigate the performance of a crossed field MHD accelerator under continuous flow operation for space propulsion purposes. Configuration studied is a divergent duct in which are applied a constant electric field across parallel electrodes and a magnetic field from an external magnet with tapered polepieces. The experimental work involved construction and test of several models, and design and operational information are described. The theoretical programs produced information on electrical conductivity of seeded gases, analysis of end and Hall effects in such a duct and calculations of performance of typical engines in terms of specific impulse and power and thrust levels. (Author)

TID-14557 $7.60

Sharp, George G., Inc., New York.
ECONOMIC STUDY OF NUCLEAR PROPULSION FOR AMERICAN FLAG TANKERS. Rept. on Contracts MA-2686 and AT(30-1)-2824. 29 Nov 61, 76p. 5 refs. Rept. N-6019; Prepared in cooperation with Combustion Engineering, Inc., Windsor, Conn.

MATERIALS

AD-273 489 repriced $1.00

Battelle Memorial Inst., Columbus, Ohio.
A STUDY OF THE MECHANISM OF THE TITANIUM-LIQUID OXYGEN EXPLOSIVE REACTION, by J. D. Jackson, P. D. Miller, and others. Rept. for 1 Oct 60-1 Sep 61, on Metallic Materials, Contract AF 33(616)7595. Jan 62, 35p. 6 refs. Technical rept. ASD-TR-61-479.

DESCRIPTORS: *Titanium, Combustion, Oxidation, Sensitivity, *Liquefied gases, *Oxygen, Chemical reactions, *Rocket oxidizers, Containers, Rupture.

A mechanism for the LOX-titanium reaction was proposed during a previous investigation (WADD TR 60-258). It was postulated that the impact of a titanium surface immersed in LOX generates sufficient heat to gasify a pocket of oxygen. In addition, the impact tends to compress the oxygen at the local impact sites. A rapid reaction occurs at the fresh surface formed by the impact. The present investigation has established that a fresh titanium surface, formed by rupture of a tensile specimen, would react in gaseous oxygen under approximately 100 psig pressure at temperatures as low as about -250 F. These results tend to substantiate the proposed mechanism. Means of eliminating or minimizing the reaction of titanium when ruptured in gaseous oxygen were investigated. The addition of HF as a gas to the oxygen resulted in some inhibition. Argon reduced the reactivity of oxygen gas by dilution. Coating the tensile specimens with fluoride-phosphate or with vapor-deposited aluminum did not affect the reactivity. These same coatings furnished some protection to titanium from reactivity during impact under LOX. (Author)

PB 159 919 $7.60

Rubber Lab., Mare Island Naval Shipyard, Vallejo, Calif.
DEVELOPMENT OF RUBBER GASKETS WHICH ARE RESISTANT TO NUCLEAR RADIATION, by R. E. Morris. Final rept. 28 Feb 61, 74p. Rept. no. 149-4; AD-253 753.

DESCRIPTORS: Gaskets, *Rubber gaskets, Seals, Radiation damage, Radiation tolerance, *Synthetic rubber, *Rubber, Additives, *Butyl rubber, *Vulcanizates, *Rubber seals, Mechanical properties, Tests, Test methods, Gamma rays, Packaging.

An investigation was conducted to develop rubber gaskets and seals capable of operating for extended periods in nuclear radiation fields. The tendency of a compressed vulcanizate to undergo compression set when exposed to gamma radiation was chosen as a criterion. Vulcanizates have been developed which are capable of satisfactory gasket service in gamma radiation fields to a dosage of 10 to the 8th power roentgens and beyond. The rubbers which are the most satisfactory for manufacture of gaskets to be used in gamma radiation fields are natural rubber, styrene/butadiene copolymers and acrylonitrile/butadiene/methacrylic acid terpolymers. The resistance of these vulcanized rubbers to compression set engendered by gamma radiation can be enhanced by compounding the rubbers with certain antioxidants or antiozonants and/or with certain chemicals containing aromatic rings or condensed ring structures. The resistance of a styrene/butadiene vulcanizate to gamma radiation is better if dicumyl peroxide is used as the vulcanizing agent in lieu of sulfur. (Author)

Adhesives and Sealants

MCW-1455 $0.50

Mallinckrodt Chemical Works, Weldon Spring, Mo.
A STUDY OF SAMPLE BOTTLES AND BOTTLE-SEALING METHODS, by S. D. Nelson, T. J. Kneip, and A. H. Mohl. Rept. on Contract W-14-108-eng-8. 20 Apr 62, 7p.

ORNL-TM-179 $1.60

Oak Ridge National Lab., Tenn.
THE DEVELOPMENT OF A SUMP-TYPE SOLIDIFIED-METAL SEAL, by R. G. Donnelly. 15 Mar 62, 11p. 3 refs.

AD-256 954 repriced $2.25

Radiation Effects Information Center, Columbus, Ohio.
THE EFFECT OF NUCLEAR RADIATION ON STRUCTURAL ADHESIVES, by N. J. Broadway and S. Palinchak. Rept. on Contract AF 33(616)7375, continuation of Contract AF 33(616)6564. 1 Mar 61, 90p. 10 refs. REIC rept. no. 17.

DESCRIPTORS: *Radioactivity, *Adhesives, *Radiation damage, Aluminum, Mechanical properties, Bonding, Structures, Stresses.

The effects of radiation on adhesives were studied on aluminum strips bonded with the structural adhesive to give lap-test specimens. The specimens were irradiated in air at ambient temperatures with no stress applied. Tensile-shear and similar tests were then run on the irradiated and nonirradiated samples. The present information summarizes the radiation stability of adhesives and suggests the areas in which further work is required. The radiation stabilities of various types of adhesives which have been reported are compared, showing the maximum doses at which they may be expected to give satisfactory service. Tensile-shear data are used primarily for these comparisons because this information has been obtained for the greatest number of adhesives. Bend-test data are also used as a means of comparison where such data are available. The adhesives are discussed according to chemical type in their approximate order of radiation stability. (Author)

Ceramics and Refractories

PB 159 952 $1.60

Chromalloy Corp., White Plains, N. Y.
EXPLOSIVE FORMING OF REFRACTORY METALS, by Richard L. Wachtell. Bi-monthly rept. no. 1, 30 June-31 Aug 59, on Contract NOas-59-6265-c. 1 Sep 59, 16p. 8 refs. AD-229 174.

DESCRIPTORS: *Refractory materials, Metals, Dies, *Explosive forming, Molybdenum, Molybdenum alloys, Alloys, Sheets, Deformation, Microstructure, Stresses, Shock waves, Propagation, Impact shock, Plastic flow, Heat resistant alloys.

ORO-325(Pt. 2) $2.60

Georgia Inst. of Tech. Engineering Experiment Station, Atlanta
MATERIALS FOR HIGH TEMPERATURE NUCLEAR ENGINEERING APPLICATIONS, by J. D. Fleming and J. W. Johnson. Progress rept. no. 2, 15 Aug 59-15 Aug 60, on Contract AT(40-1)-2483. 30p.

ORNL-TM-123 $1.60

Oak Ridge National Lab., Tenn.
THERMAL STRESSES IN SOLID CYLINDERS OF BERYLLIUM OXIDE, by R. W. Swindeman. Rept. on Contract W-7405-eng-26. 6 Apr 62, 18p. 10 refs.

Plastics

DC-55-5-90 $9.10

General Electric Co., Cincinnati, Ohio.
SURVEY AND EVALUATION REPORT ON RADIATION DAMAGE TO PLASTIC MATERIALS, by C. G. Collins, W. J. Stapp, and V. P. Calkins. Rept. on Contract AT(11-1)-171, 113p.

PB 152 182 $3.60

Plastics Lab., Princeton U., N. J.
DYNAMIC MECHANICAL SPECTRA AND LIMIT OF LINEAR VISCOELASTICITY OF PLASTICS, by Claude Guimon and Bryce Maxwell. Rept. on Contract DA 36-039-sc-78105. 15 Aug 60, 32p. 4 refs. Technical rept. 59B; AD-243 747.

DESCRIPTORS: *Plastics, Mechanical properties, *Polymers, Ethylenes, Styrenes, Stresses, Load distribution, Elasticity, Temperature.

The dynamic mechanical properties of a typical polycrystalline polymer (polyethylene) and a typical glassy state amorphous polymer (polystyrene) have been studied as a function of both frequency and temperature. The response of these materials to mechanical loading was found to be dependent upon the magnitude of strain resulting from the mechanical load above the limit of linear viscoelastic response. Therefore, the limit of linear viscoelastic response must be considered as an important material characteristic in design application of plastics. This limit has been studied as a function of time scale of loading and polymer structure for a series of materials. A general trend of increased strain limit of linear viscoelastic response with increased heterogeneity of internal structure has been found. (Author)

MATHEMATICS

AD-270 871 $8.60

General Dynamics/Convair, San Diego, Calif.
A STUDY OF RUSSIAN FEED-BACK CONTROL THEORY. PART I. THE APPLICATION OF SOME FOREIGN METHODS TO THE ANALYSIS OF A BI-STABLE AUTOPILOT CONFIGURATION, by Fredric R. Alex and C. R. Heerman. Rept. for 1 June 60-1 Jan 61, on Contract AF 33(616)7371. Feb 61, 96p. 33 refs. WADD Technical rept. 61-32, Part I.

DESCRIPTORS: Flight, *Control systems, Germany, *Automatic pilots, Stability, Linear systems, Nonlinear systems, *Feedback, Equations of motion, Simulation, Analog computers

This report covers the presentation and discussion of two groups of foreign methods, (one Russian-German, one Russian), of immediate interest to the flight control designer. Both methods represent developments of conventional concepts into closed - or self-contained - methods. They are demonstrated on two non-linear mathematical models of distinct systems, representing equivalent systems of an adaptive autopilot configuration. By Popov's Magnus' methods stability borders and their properties are derived for a sixth order non-linear system model as functions of various control parameters. By Tsypkin's and Korolev's methods a feedback synthesis for a relay system, with and without hysteresis, is carried out. Incorporated into the presentation of both methods are full discussions of their mathematical background and the derivation of the pertinent criteria [(n-1) th Hurwitz minors, Michailov, Popov] applied in the course of the analysis. (Author)

AD-270 874 $4.60

General Dynamics/Convair, San Diego, Calif.
A STUDY OF RUSSIAN FEED-BACK CONTROL THEORY. PART II, VOL. 1. A SURVEY OF RUSSIAN CONTROL LITERATURE. LINEAR METHODS OF ANALYSIS, by F. R. Alex. Rept. for June 60-Feb 61, on Contract AF 33(616)7371. Feb 61, 50p. 41 refs. Convair rept. ZU-044; WADD Technical rept. 61-32, Part II, Volume 1.

DESCRIPTORS: Linear systems, *Control systems, Theory, *Feedback, Stability, Determinants, Automatic, Partial differential equations, Literature.

Methods for analysis of non-linear systems currently in use in the United States do not provide sufficient insight of system operation or capability for handling multiple non-linearities separated by linear elements. Since the Russians seem to be more active in the field of non-linear analysis than any other group in the world today, a survey of their literature on the subject has been made. This is the first volume covering the results dealing with linear methods. The methods of approach and mathematical development differ from Western methods. It is believed that a presentation of some Russian topics on linear analysis will be helpful in understanding the penetration of Russian work on non-linearities. (Author)

AD-270 872 $9.60

General Dynamics/Convair, San Diego, Calif.
A STUDY OF RUSSIAN FEED-BACK CONTROL THEORY. PART II, VOLUME 2. A SURVEY OF RUSSIAN CONTROL LITERATURE. LIAPOUNOV'S THEORY OF STABILITY, by F. R. Alex. Rept. for June 60-Feb 61, on Contract AF 33(616)7371. Feb 61, 113p. 18 refs. Convair rept. ZU-044; WADD Technical rept. 61-32, Part II, Volume 2.

DESCRIPTORS: *Feedback, *Control systems, Management engineering, *Mathematics, Stability, Special functions, *Motion, Literature, Bibliography, Literature.

In his Doctor's Dissertation published in 1892 in Kharkov, Russia, A. M. Liapounov develops and discusses a highly refined and sophisticated concept of the stability of motion, proposing mathematically rigorous definitions of the stability of motion and analytical methods for the investigation of the conditions for stability. The dissertation is addressed to the pure mathematician. There is no evidence that Liapounov was ever aware of the possibility of an application of his ideas to the analysis of physical systems and control systems in particular. This report presents an introduction to Liapounov's theory and the derived methods from the viewpoint of the control systems engineer. (Author)

AD-270 873 $12.50

General Dynamics/Convair, San Diego, Calif.
A STUDY OF RUSSIAN FEED-BACK CONTROL THEORY. PART II, VOLUME 3. A SURVEY OF RUSSIAN CONTROL LITERATURE. KRYLOV AND BOGILIUBOV'S METHOD OF HARMONIC LINEARIZATION, by F. R. Alex. Rept. for June 60-Feb 61, on Contract AF 33(616)7371. Feb 61, 176p. 13 refs. Convair rept. ZU-044; WADD Technical rept. 61-32, Part II, Volume 3.

DESCRIPTORS: *Feedback, *Control systems, Theory, Servomechanisms, *Harmonic analysis, Topograpy, Nonlinear systems, *Bibliography.

The development of rigorous mathematical methods for analysis of non-linear systems has not progressed to the point where a wide enough variety of systems can be accommodated without excessive difficulty. As a result, considerable effort has been expended on development of approximation methods. The most important of these methods was formulated by N. M. Krylov and N. N. Bogoliubov. This report is devoted entirely to the presentation of the methods of Harmonic Linearization proposed by Krylov and Bogoliubov and to other techniques resulting from their work. (Author)

AD-270 584 $6.60

General Dynamics/Convair, San Diego, Calif.
A STUDY OF RUSSIAN FEED-BACK CONTROL THEORY. PART II, VOLUME 4. A SURVEY OF RUSSIAN CONTROL LITERATURE. THE METHOD OF SMALL PARAMETERS, by F. R. Alex. Rept. for June 60-Feb 61, on Contract AF 33(616)7371. Feb 61, 62p. 13 refs. Convair rept. ZU-044; WADD Technical rept. 61-32, Part II, Volume 4.

DESCRIPTORS: *Control systems, *Feedback, Theory, *Celestial mechanics, Bibliography, Applied mechanics, Differential equations, Non-linear differential equations, Literature

In this report the Poincaré method with Liapounov's refinements, the two Bulgakov methods, and the Krylov method are covered completely. The scope of successful applications of the Poincaré method is rather limited because the non-linearity must be sufficiently small and a closed periodic solution for the linear differential equation must be known. (Author)

AD-270 585 $9.60

General Dynamics/Convair, San Diego, Calif.
A STUDY OF RUSSIAN FEED-BACK CONTROL THEORY. PART II, VOLUME 5. A SURVEY OF RUSSIAN CONTROL LITERATURE. ADVANCED PHASE PLANE TECHNIQUES POINT TRANSFORMATIONS, by F. R. Alex. Rept. for June 60-Feb 61, on Contract AF 33(616)7371. Feb 61, 115p. 19 refs. Convair rept. ZU-044; WADD Technical rept. 61-32, Part II, Volume 5.

DESCRIPTORS: *Control systems, *Feedback, Theory, Synthesis, Differential equations, Topology, Nonlinear differential equations, *Transformations (Mathematics), Literature.

This report is devoted to the presentation of the present state of Russian phase plane techniques. The principle of point-transformation as an analytical tool for phase plane analysis is treated extensively. The conditions for existence of limit cycle are discussed and the criteria demonstrated with examples. The topological and analytical features of the phase plane are presented. (Author)

DC-60-1-159 $2.60

General Electric Co., Cincinnati, Ohio.
LEAST SQUARES FIT INCLUDING ESTIMATE OF ERROR IN PARAMETERS, by H. S. Drew. Rept. on Contract AT(11-1)-171. 20 Jan 60, 28p.

DC-57-8-158 $1.10

General Electric Co., Cincinnati, Ohio.
POLYNOMIAL APPROXIMATION OF LINEAR GAMMA RAY ABSORPTION COEFFICIENTS, by M. A. Capo. Rept. on Contract AT(11-1)-171. 19 Aug 57, 11p.

DC-57-1-19 $1.60

General Electric Co., Cincinnati, Ohio.
PROGRAM FOR EVALUATION OF THE EXPONENTIAL INTEGRAL ON THE IBM 650 COMPUTER, by A. J. Ness. Rept. on Contract AT(11-1)-171. 1 Sep 56, 18p.

K-1499 $1.50

Oak Ridge Gaseous Diffusion Plant, Tenn.
CRITICAL PATH SCHEDULING WITH RESOURCE LEVELING ON THE IBM-7090, by W. A. Gray and E. M. Kidd. Rept. on Contract W-7405-eng-26. 20 Mar 62, 69p. 4 refs.

SCTM-311-62-81 $0.50

Sandia Corp., Albuquerque, N. Mex.
MEASUREMENT OF POWER SPECTRA FOR NONSTATIONARY RANDOM SIGNALS, by P. T. Schoenemann. Rept. on Contract AT(29-1)-789. Apr 62, 17p. 11 refs.

Computing Devices

PPAD-432C $1.60

Princeton-Pennsylvania Accelerator, Princeton, U., N. J.
IBM-650 PROGRAM FOR TWO-BODY KINEMATICS, by Kenneth Edwards. Technical rept. no. 26 on Contracts AT(30-1)-2137 and Nonr-1858(06). 2 Oct 61, 14p.

PPAD-433C $1.60

Princeton-Pennsylvania Accelerator, Princeton U., N. J.
ORBIT CALCULATIONS FOR THE 15" BUBBLE CHAMBER, by Kenneth Edwards. Technical rept. no. 27 on Contracts AT(30-1)-2137 and Nonr-1858(06). 4 Oct 61, 19p.

TID-15203 $4.60

Digital Computer Lab., U. of Illinois, Urbana.
TECHNICAL PROGRESS REPORT. PART I. HIGH-SPEED COMPUTER PROGRAM. PART II. CIRCUIT RESEARCH PROGRAM. PART III. DATA REDUCTION METHODS. PART IV. ILLIAC USE AND OPERATION. PART V. IBM 650 USE AND OPERATION. PART VI. INSTRUCTIONAL USE OF COMPUTERS. PART VII. GENERAL LABORATORY INFORMATION. Rept. on Contract AT(11-1)-415. Dec 61, 42p.

MECHANICS

AD-271 963 repriced $1.00

Minnesota U., Minneapolis.
ANALYTICAL FORMULATION OF DAMPED STRESS-STRAIN RELATIONS BASED ON EXPERIMENTAL DATA WITH APPLICATIONS TO VIBRATING STRUCTURES, by T. J. Mentel and C. C. Fu. Rept. for June 60-June 61, on Metallic Materials, Contract AF 33(616)6828. Nov 61, 38p. 10 refs. ASD Technical rept. 61-623.

DESCRIPTORS: Materials, Metals, Structures, *Cantilever beams, *Damping, *Stresses, Vibration, Mathematical analysis, Theory, Hysteresis.

The analytical technique of describing material damping by elliptical hysteresis loops was applied to experimental damping data to produce damped, stress-strain relations. The objective of this approach is to produce an easily tractable mathematical description of the stress-strain relation which at the same time adheres closely to experimentally observed behavior. An extension of this development to the biaxial stress case is also demonstrated, although certain special assumptions concerning the role of distortional and dilatational strain energies are necessary in order to achieve this. An example application to the flexural vibration of a cantilever beam is shown to illustrate the aforementioned properties. (Author)

AD-257 807 repriced $1.50

Polytechnic Inst. of Brooklyn, N. Y.
THE DOWNSTREAM INFLUENCE OF MASS TRANSFER AT THE NOSE OF A SLENDER CONE, by Robert J. Cresci and Paul A. Libby. Rept. for Feb 60-Feb 61, on Experimental Techniques for Materials Research, and Research on Aerodynamic Flow Fields, Contracts AF 33(616)5944 and AF 33(616)7661. Jan 62, 56p. 17 refs. [PIBAL no. 634] Technical Documentary rept. no. WADD TR-60-892.

DESCRIPTORS: *Mass transfer, *Hypersonic flow, Shock waves, Ablation, Diffusion, *Conical bodies, *Heat transfer, Coolants, *Film cooling, *Sweat cooling, Boundary layer, Pressure, Helium, Turbulent boundary layer, Laminar boundary layer, Gas flow, Nitrogen, *Guided missile noses, Hypersonic wind tunnels, Tests.

The influence of localized mass transfer at the nose of a slender cone under hypersonic flow conditions was studied by experimental and theoretical means. Two gaseous coolants, nitrogen and helium are injected through a porous plug subtending a half angle of 30 degrees. The effect of the mass transfer on the shock shape, pressure distribution, heat transfer and transition are investigated. The theoretical analysis involved a study of the effect of mass transfer on the shock stand-off distance and leads to an inviscid flow parameter permitting the experimentally determined shock shape and pressure distribution to be extrapolated to other than test conditions and to other coolant gases. Significant reductions in heat transfer are obtained with injection. Indeed with small amounts of helium injection the peak heating is found to occur downstream on the cone and to be an order of magnitude less than would occur at the stagnation point without mass transfer. With nitrogen early transition is found to occur so that local heating rates are actually increased over those prevailing at the same Reynolds number without injection. (Author)

METALLURGY

ANL-6055 $0.50

Argonne National Lab., Ill.
THE URANIUM-RICH END OF THE URANIUM-ZIRCONIUM SYSTEM, by S. T. Zegler. Rept. on Contract W-31-109-eng-38. Feb 62, 25p. 17 refs.

AD-274 037 repriced $1.25

Armour Research Foundation, Chicago, Ill.
DEVELOPMENT OF A Ti-Al-Cb ALLOY FOR USE AT 1200°-1800°F, by Joseph B. McAndrew and Charles R. Simcoe. Rept. for 1 May 60-31 July 61, on Metallic Materials, Contract AF 33(616)7262. Mar 62, 43p. Technical Documentary rept. no. ASD TR-61-446.

DESCRIPTORS: *Titanium alloys, *Aluminum alloys, *Niobium alloys, Heat resistant alloys, Alloys, Preparation, Oxidation, Tensile properties, Mechanical properties, Stresses, Sheets, Tests, Hafnium, Tin, Zirconium, Metallurgy.

Titanium-base alloys containing major amounts of columbium and aluminum are being studied with the object of developing new high-temperature alloys of low density. This report presents the findings of the second year of this program, derived from the preparation an and examination of: 35 quaternary alloys containing small additions of tin, hafnium, or zirconium; 4 high-purity ternary alloys; and ten-pound melts of Ti-15Cb-10Al and Ti-17.5Cb-15Al. In a number of alloys, improved tensile properties and oxidation resistance resulted from the addition of tin, hafnium, or zirconium, and in some instances very high strength-density ratios were maintained up to 1800°F. The properties of high-purity alloys were similar to those of alloys prepared with sponge titanium. It is recommended that further effort should be directed toward the more highly alloyed compositions, including those containing hafnium and zirconium. (Author)

PB 159 932 R $4.60

Armour Research Foundation, Chicago, Ill.
IMPROVEMENT OF HIGH-STRENGTH ALUMINUM CASTINGS, by C. R. Lillie and Charles R. Simcoe. Final rept. 27 Aug 58-27 Aug 59, on Contract DA 11-022-507-ORD-2890. 8 June 60, 49p. 3 refs. ARF 2157-12; AD-240 237.

DESCRIPTORS: *Aluminum castings, *Aluminum alloys, Aging, Heat treatment, Hardness, Mechanical properties, Magnesium alloys, Zinc alloys, Titanium alloys, Manganese alloys, Copper alloys, Chromium alloys, Beryllium alloys.

Comparison of the aging behavior of a commercial Al-10Mg alloy (No. 220 alloy) and a high-purity Al-10Mg alloy showed that the aging behavior of such alloys is relatively insensitive to variation in either solution treatment or cooling rate after solution treatment. There is evidence that the commercial 220 alloy may be stabilized against change in hardness due to room temperature aging for times up to 1000 hours by preliminary aging at 80°, 100° or 150° C. A second phase concerned an investigation of compositional modifications of an experimental aluminum-base casting alloy, X-250. The X-250 alloy, containing 8% Mg, 1.5% Zn. 0.25% Mn, and 0.15% Cu, is reputedly nearly non-aging at room temperature. Evidence obtained from hardness-time curves for aging at 150°C indicates that the X-250 alloy ages more rapidly and to a greater extent than do alloys of the following novel compositions: Al-8Mg-1Mn-0.1Ti-0.003Be, Al-8Mg-1Cu-0.1Ti-0.003Be, and Al-8Mg-2Cr-0.1Ti-0.003Be.

DC-56-12-104 $2.60

General Electric Co., Cincinnati, Ohio.
DESIGN PROPOSAL--2100°F BRAZING FURNACE, VACUUM OR HYDROGEN ATMOSPHERE, by S. E. Eckard, R. D. Etheridge, and P. T. Ryan. Rept. on Contract AT(11-1)-171. 14 Dec 56, 21p.

DC-55-5-16 $1.60

General Electric Co., Cincinnati, Ohio.
DEVELOPMENT OF RESISTANCE WELDING TECHNIQUE FOR THERMOCOUPLE ATTACHMENT, by R. R. Cost. Rept. on Contract AT(11-1)-171. 25 Apr 55, declassified 26 July 61. 12p.

DC-60-6-125 $1.60

General Electric Co., Cincinnati, Ohio.
EFFECT OF CHROMIZING ON THE OXIDATION AND SCALING RESISTANCE OF VARIOUS HIGH TEMPERATURE ALLOYS, by S. E. Eckard. Rept. on Contract AT(11-1)-171. 23 June 60, 20p.

AD-273 707 repriced $1.50

Martin Co., Baltimore, Md.
STRUCTURAL RESPONSE OF BERYLLIUM SHEET PRODUCED BY THREE FABRICATION METHODS, by C. J. Giemza, Final rept. Feb 60-Mar 61, on Contract AF 33(600)40648. Dec 61. 56p. 7 refs. ASD Technical rept. 61-87.

DESCRIPTORS: *Beryllium, Sheets, Metal forming presses, Rolling mills, Mechanical properties, Hardening, Production, Structures, Mathematical analysis.

Hot-pressed, hot-upset and hot cross-rolled beryllium sheet is examined experimentally to determine mechanical behavior and relative structural superiority. Mechanical tests emphasizing factors which would tend to embrittle beryllium were employed. The data indicated that a high hardening rate and, not necessarily, high tensile elongation were associated with resistance to embrittlement. The results, in general, indicate that hot-upset exhibited the best mechanical characteristics possessed by both hot-pressed and hot cross-rolled beryllium sheet. (Author)

NMI-2103 $1.60

Nuclear Metals, Inc., Concord, Mass.
FUNDAMENTAL AND APPLIED RESEARCH AND DEVELOPMENT IN METALLURGY. Progress rept. Jan 62, on Contract AT(30-1)-2784. 4 Apr 62, 12 refs.

ORNL-TM-129 $1.60

Oak Ridge National Lab., Tenn.
FUEL ELEMENT COOLANT CHANNEL AND OTHER SPACING MEASUREMENTS BY EDDY-CURRENT TECHNIQUES, by C. V. Dodd and R. W. McClung. Rept. on Contract W-7405-eng-26. 20 Mar 62, 20p.

ORNL-TM-147 $2.60

Oak Ridge National Lab., Tenn.
WELDING AND BRAZING OF HIGH-TEMPERATURE RADIATORS AND HEAT EXCHANGERS, by G. M. Slaughter and P. Patriarca. 20 Feb 62, 26p. 9 refs.

CNLM-3342 $1.10

Pratt and Whitney Aircraft Div., United Aircraft Corp., Middletown, Conn.
SPINNING OF COLUMBIUM AND COLUMBIUM 1%-ZIRCONIUM TUBING, by Wharton R. Barker. Interim rept. on Contract AT(11-1)-229. 19 Jan 61, 8p.

CNLM-1758 $1.10

Pratt and Whitney Aircraft Div., United Aircraft Corp., Middletown, Conn.
WELDABILITY OF HAYNES ALLOY #25, by S. L. Rogers. Final rept. on Project 1065. 19 May 59, 7p.

Ferrous Metals

AD-273 867 repriced $2.75

Electric Boat Div., General Dynamics Corp., Groton, Conn.
INVESTIGATION OF WELDABILITY OF HOT-WORK TOOL STEELS, by N. A. Sinclair, J. G. Maciora, and R. P. Sopher. Rept. for 3 Apr 59-31 Mar 61, on Materials Application, Contract AF 33(616)6519. Dec 61. 136p. 13 refs. ASD Technical rept. 61-165.

DESCRIPTORS: *Tool steel, Welds, Sheets, Metal plates, *Welding, Statistical analysis, Mechanical properties, Hardening, Fracture (Mechanics), Tensile properties, Temperature, Pressure vessels.

The weldability of six hot-work tool steels was investigated. Welds were made in sheet and plate with the inert-gas tungsten-arc and inert-gas consumable electrode processes under various welding conditions. Variations in preheat, postheat, and energy input were investigated and a statistical analysis of the effects on mechanical properties after hardening and tempering was made. Tendencies toward hot and cold cracking were investigated using Lehigh restraint tests. The effect of preheat temperature on low-temperature cracking was also studied. Impact data were generated on various weldments in addition to the determination of tensile properties at room and elevated temperatures. High temperature weld strength was found to be 190,000 psi for an H-11 steel but was reduced to 156,000 psi after holding at 1000°F for 24 hours. Small scale pressure vessels were tested both dynamically and statically and sheet bulge tests were conducted. (Author)

TID-15069 $5.60

W. M. Keck Lab. of Engineering Materials, Calif. Inst. of Tech., Pasadena.
A DELAY TIME IN THE ALPHA TO GAMMA TRANSFORMATION IN IRON, by Olaf A. Boedtker and Pol Duwez. Technical rept. no. 3 on Contract Nonr-220(30) and AT(04-3)-221. Mar 62, 58p.

NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

IS-349 $1.25

Ames Lab., Iowa State U. of Science and Tech.
ANNUAL SUMMARY RESEARCH REPORT IN PHYSICS, 1 July 60-30 June 61, on Contract W-7405-eng-82. Sep 61, 64p. 143 refs.

ANL-6511 $1.50

Argonne National Lab., Ill.
MULTIGROUP CALCULATIONS OF EFFECTIVE DELAYED-NEUTRON FRACTIONS, PROMPT-NEUTRON LIFETIME, AND RELATED KINETICS PARAMETERS. IBM-704 PROGRAM 1188/RE, by L. C. Kvitek. Rept. on Contract W-31-109-eng-38. Mar 62, 57p. 8 refs.

ANL-6523 $0.50

Argonne National Lab., Ill.
A STUDY OF LIQUIDS BY NEUTRON SCATTERING, by P. J. Persiani. Rept. on Contract W-31-109-eng-38. Mar 62, 14p. 18 refs.

NAA-SR-4355 $1.75

Atomics International, Canoga Park, Calif.
RADIOLYSIS PRODUCTS OF POLYPHENYL COOLANTS. PART I. IN-PILE LOOP IRRADIATIONS, by R. T. Keen, R. A. Baxter and others. Rept. on Contract AT(11-1)-GEN-8. 30 Mar 62, 70p. 15 refs.

TID-15082 $4.60

Booz-Allen Applied Research, Inc., Glenview, Ill.
DEVELOPMENT OF KRYPTON-85 CLATHRATE ANALYTICAL TECHNIQUES TO MEASURE OXIDATION-REDUCTION PRODUCTS IN THE LIQUID STATE, by George J. Rotariu, Donald M. Hattori, and Elizabeth L. Hoskins. Quarterly technical status rept. no. 1, 15 June-29 Sep 61, on Contract AT(11-1)-1061. 20 Oct 61, 50p.

NYO-9284 $11.50

Carnegie Inst. of Tech., Pittsburgh, Pa.
CONTRIBUTIONS OF PION AND NUCLEON CURRENTS TO RADIATIVE MU-MESON CAPTURE BY A PROTON, by Glenn Keith Manacher. Rept. on Contract AT(20-1)-882. May 61, 160p. 35 refs.

NYO-9850 $1.60

Consolidation Coal Co., Library, Pa.
UTILIZATION OF RADIOACTIVE ISOTOPES IN COAL PROCESS RESEARCH, by P. M. Yavorsky, J. L. Freeman, and E. Gorin. Quarterly technical status rept. no. 11 on Contract AT(30-1)-2350. 1 Apr 62, 15p.

PB 159 933 $3.60

Convair, Fort Worth, Tex.
CURVE FITS OF GAMMA-RAY DIFFERENTIAL-ENERGY SPECTRA, by D. D. Babb, J. W. Keller, and E. McCray. Rept. on Contract AF 33(600)38946. 1 Nov 59, 38p. 2 refs. NARF-59-36T; MR-N-251; AD-229 401.

DESCRIPTORS: *Gamma rays, Gamma ray spectroscopy, Energy, *Curve fitting, Data, Penetration, Materials, Tables.

The results of the Nuclear Development Association (NDA) moments-method calculations of the penetration of gamma rays through various media from point-isotropic sources were interpolated and extrapolated to give differential energy spectra for a larger set of initial and final energies. For each of the new pairs of energies the data were fitted analytically and tabulated as a function of penetration distance and atomic number. The function used for the fit is: $\ln \frac{f(t)}{u_o r} = a_1(\mu_o r)^2 + a_2(\mu_o r) + a_3(\mu_o r)Z + a_4 Z + a_5 Z^2 + a_6$ where f(t) is the function tabulated by NDA. The range of Z was divided into 3 sections and the fit made independently for each section. Thus, 18 coefficients were required for each of 104 energy pairs. (Author)

RFP-258 $0.50

Dow Chemical Co., Denver, Colo.
EMPIRICAL ANALYSIS OF CRITICAL MASS DATA INVOLVING ENRICHED URANIUM METAL IN WATER, by C. L. Schuske and C. L. Bell. Rept. on Contract AT(29-1)-1106. 21 Mar 62, 6p. 3 refs.

RFP-108 $1.60

Dow Chemical Co., Denver, Colo.
METHOD FOR CALCULATING U^{235} METAL STORAGE ARRAYS, by C. L. Schuske. Rept. on Contract AT(29-1)-1106. 7 May 58, declassified 31 Oct 61. 13p.

DC-57-1-75 $1.10

General Electric Co., Cincinnati, Ohio
FISSION NEUTRON SPECTRUM FOR U^{235}, by F. Silverstein. Rept. on Contract AT(11-1)-171. 19 Dec 56, 8p.

DC-58-9-198 $2.60

General Electric Co., Cincinnati, Ohio.
MULTI-ENERGY NEUTRON DIFFUSION ADJOINT (DIGITAL COMPUTER PROGRAM G*) by D. R. Speece Rept. on Contract AT(11-1)-171. 26 May 58, 23p.

DC-58-5-132 $10.50

General Electric Co., Cincinnati, Ohio.
SHIELDING COMPUTER PROGRAM 14-0, REACTION SHIELD ANALYSIS, by J. T. Martin, J. P. Yalch, and W. E. Edwards. Rept. on Contract AT(11-1)-171. 19 May 58, 138p.

DC-57-11-103 $1.10

General Electric Co., Cincinnati, Ohio.
SOURCE FUNCTION COEFFICIENT EVALUATION, by Mary Ann Capo. Rept. on Contract AT(11-1)-171. 14 Nov 57, 8p.

HW-72586 $2.00

Hanford Atomic Products Operation, Richland, Wash.
PHYSICS RESEARCH QUARTERLY REPORT, OCTOBER, NOVEMBER, DECEMBER, 1961, on Contract AT(45-1)-1350. 31 Jan 62, 78p. 8 refs.

HW-57288 $2.60

Hanford Atomic Products Operation, Richland, Wash.
PLUTONIUM RECOVERY FROM CONTAMINATED MATERIALS. PROJECT CGC-813 - PROCESS DESIGN, by E. Doud. Rept. on Contract W-31-109-eng-52. 27 Aug 58, 25p.

HW-58610 $1.60

Hanford Atomic Products Operation, Richland, Wash.
PLUTONIUM RECOVERY FROM CONTAMINATED MATERIALS, PROJECT CGC-813 - SCOPE REVISION NO. 1, by E. Doud. Rept. on Contract AT(45-1)-1350. 23 Jan 59, 15p.

TID-14086 $3.60

Institute of Polymer Research, Polytechnic Inst. of Brooklyn, N. Y.
POLYMERIZATION IN THE CRYSTALLINE STATE. II. ALKALI ACRYLATES AND METHACRYLATES, by H. Morawetz and I. D. Rubin. Rept. on Contract AT(30-1)-1715. Mar 62, 33p. 13 refs.

TID-14087 $1.60

Institute of Polymer Research, Polytechnic Inst. of Brooklyn, N. Y.
POLYMERIZATION IN THE CRYSTALLINE STATE. III. METHACRYLIC ACID AND BUTADIENE-1-CARBOXYLIC ACID, by H. Morawetz and I. D. Rubin. Rept. on Contract AT(30-1)-1715. Mar 62, 12p. 15 refs.

TID-14085 $3.60

[Institute of Polymer Research] Polytechnic Inst. of Brooklyn, N. Y.
SOLID STATE POLYMERIZATION INITIATED BY GAMMA RADIATION, by Herbert Morawetz, Benjamin Post and others. Progress rept. on Contract AT(30-1)-1715. 24 Oct 61, 38p.

NLCO-685 $12.00

National Lead Co. of Ohio, Cincinnati.
SUMMARY TECHNICAL REPORT FOR THE PERIOD 1 APRIL-30 JUNE 57, ed. by John W. Simmons. Rept. on Contract AT(30-1)-1156. [1957] declassified 17 Dec 61. 165p.

NLCO-790 $8.10

National Lead Co. of Ohio, Cincinnati.
SUMMARY TECHNICAL REPORT FOR THE PERIOD 1 APRIL-30 JUNE 59, ed. by John W. Simmons. Rept. on Contract AT(30-1)-1156. 20 July 59, declassified 28 Nov 61. 83p.

TID-15072 $2.60

New Hampshire U., Durham.
GAMMA RAY INDUCED DECOMPOSITION OF ORANGE IV IN AQUEOUS AND ALCOHOLIC SOLUTIONS, by Allen A. Denio, Jay H. Worrell, and Alexander R. Amell. Rept. on Contract AT(30-1)-1911. 1961. 22p.

TID-15083 $1.60

New Hampshire U., Durham.
THE RADIATION INDUCED EXCHANGE OF CARBON-14 BETWEEN ETHANE AND METHYL AMINE, by Philip S. Lamprey and Alexander R. Amell. Rept. on Contract AT(30-1)-1911. 1961. 15p. Prepared in cooperation with Lafayette Coll., Easton, Pa.

ORNL-TM-164 $1.60

Oak Ridge National Lab., Tenn.
RADIOCHEMICAL PROCESSING: OFF-SITE TRANSPORTATION AND ULTIMATE STORAGE PROBLEMS, by J. O. Blomeke and L. B. Shappert. 14 Mar 62, 20p. 22 refs. Presented at the AICHE Symposium on Nuclear Chemical Plant Safety, Washington, D. C., December 4-7, 1960.

ORNL-TM-168 $3.60

Oak Ridge National Lab., Tenn.
SWAPS: AN EXPERIMENTAL PROGRAM FOR NUMERICAL SOLUTION OF THE TRANSPORT EQUATION WITH ANISOTROPIC SCATTERING IN ONE-DIMENSIONAL SLAB GEOMETRY, by Melvin L. Tobias and Tom B. Fowler. 8 Mar 62, 38p. 6 refs.

PB 159 937 $3.60

Propulsion Lab., Wright Air Development Div., Wright-Patterson AFB, Ohio
USE OF ANALOG COMPUTER TO SOLVE PROBLEMS OF NONUNIFORMLY LOADED NUCLEAR REACTORS, by Irving A. Peltier. Rept. for Apr 59-Apr 60, on Nuclear Ramjet Project. Sep 60, 31p. WADD Technical rept. 60-391; AD-247 180.

NYO-9420 $1.00

Radiation Applications, Inc., Long Island City, N. Y.
A COMPARISON OF RADIATION-INDUCED GRAFT COPOLYMERIZATION UTILIZING ELECTRON ACCELERATORS AND ISOTOPE SOURCES AS RADIATION INITIATORS, by George Odian, William F. Oliver and others. Final rept. 18 July 60-17 Oct 61, on Contract AT(30-1)-2636, 7 Nov 61, 26p. 7 refs.

NYO-10127 $1.60

Rochester U., N. Y.
EFFECT OF THE π^--π AND K-π RESONANCES ON THE KAON FORM FACTOR, by S. K. Bose. Rept. on Contract AT(30-1)-875. 20 Feb 62, 10p. 6 refs.

NYO-10126 $1.60

Rochester U., N. Y.
A SEARCH FOR HIGH ENERGY COSMIC GAMMA RAYS IN EMULSIONS, by J. Klarmann. Rept. on Contract AT(30-1)-875. 16 Feb 62, 15p. 11 refs.

SCR-480 $0.50

Sandia Corp., Albuquerque, N. Mex.
NEUTRON FLUX AND SPECTRA MEASUREMENTS IN THE VOID TANK OF THE TRIGA MARK-F REACTOR, by K. C. Humpherys. Feb 62, 16p. 4 refs.

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Savannah River Lab., Aiken, S. C.
ELECTROLYTIC DISSOLUTION OF POWER REACTOR FUELS IN NITRIC ACID, by A. Thomas Clark, Jr., Leon H. Myer and others. Rept. on Contract AT(07-2)-1. Oct 61, 24p. 22 refs.

CVNA-107 $8.60

Westinghouse Electric Corp., Pittsburgh, Pa.
KERNMAT: A FORTRAN CODE FOR THE HETEROGENEOUS METHOD OF REACTOR CALCULATIONS, by S. A. Raje. Rept. on Contract AT(30-1)-2289. Sep 61, 100p. 16 refs.

Elementary Particles

HEPL-249 $1.60

High Energy Physics Lab., Stanford U., Calif.
PRODUCTION OF POSITRONS WITH THE STANFORD MARK III ACCELERATOR, by D. Yount and J. Pine. Rept. on Contract AT(04-3)-326. [1961] 17p. 13 refs.

NYO-10033 $2.60

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RESONANT STATISTICAL MODEL OF PARTICLE PRODUCTION, by G. Pinski. Rept. on Contract AT(30-1)-875. 22 Jan 62, 24p.

NYO-10125 $1.10

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SOME CONSIDERATIONS ON "ELEMENTARY" PARTICLES AND BOUND STATES IN STRONG INTERACTIONS, by R. Acharya. Rept. on Contract AT(30-1)-875. 16 Feb 62, 10p. 11 refs.

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GAMMA-RAY DISCRIMINATION IN A PROTON-RECOIL PROPORTIONAL COUNTER, by E. F. Bennett. Rept. on Contract W-31-109-eng-38. Mar 62, 21p. 8 refs.

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DEVELOPMENT LEADING TO AN IMPROVED DENSITOMETER FOR HELIUM-GRAPHITE OR NITROGEN-GRAPHITE FLOW STREAMS, by Donald H. Strobel. Quarterly rept. no. 189-3, Nov 61-Jan 62, on Contract AT(11-1)-1111. 27 Feb 62, 27p.

BNL-721(T-255) $0.50

Brookhaven National Lab., Upton, N. Y.
SOLAR CELL DOSIMETER, by A. Muller, F. Rizzo, and L. Galanter. Rept. no. 1. Feb 62, 11p. 7 refs.

DC-59-5-16 $1.60

General Electric Co., Cincinnati, Ohio
HIGH-SPEED SCALER: BERKELEY MODULAR, by J. L. Beene. Rept. on Contract AT(11-1)-171. 24 Apr 59, 15p.

DC-60-4-174 $2.60

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NUCLEAR REACTOR CONTROL SENSORS. A SURVEY OF COMMERCIALLY AVAILABLE NEUTRON DETECTORS FOR POSSIBLE APPLICATION TO ANP CONTROL SYSTEMS, by K. W. Arnold. Rept. on Contract AT(11-1)-171. 28 Apr 60, 31p.

DC-57-1-95 $1.60

General Electric Co., Cincinnati, Ohio.
THERMOCOUPLES FOR FUEL ELEMENT PLATE TEMPERATURE AND CONTROL, by W. D. Kuhlman and J. W. Glasgow. Preliminary rept. on Contract AT(11-1)-171. 16 Jan 57, declassified 20 June 61. 17p.

HW-69879(Rev.) $0.75

Hanford Atomic Products Operation, Richland, Wash.
AN AREA RADIATION MONITOR WITH LOGARITHMIC AND LINEAR RANGES, by W. G. Spear. Rept. on Contract AT(45-1)-1350. 22 Jan 62, 22p. 8 refs.

UCRL-6740 $1.00

Lawrence Radiation Lab., U. of California, Livermore.
TECHNIQUES FOR EVALUATING THE COMMERCIAL PHOTOCATHODE, by George A. Condas. Rept. on Contract W-7405-eng-48. 12 Jan 62, 35p. 17 refs.

NYO-7877(Rev.1) $0.50

Plasma Physics Lab., Princeton U., N. J.
SUMMARY OF NEUTRON MEASUREMENT METHODS, by Herman L. Miller. Technical memo. no. 35 (Rev. 1) on Contract AT(30-1)-1238. 12 Feb 62, 21p. 51 refs.

NYO-10030 $1.10

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RESONANT DEPOLARIZATION OF A BEAM OF POLARIZED PROTONS DURING ACCELERATION IN A SYNCHROCYCLOTRON, by F. Lobkowicz and E. H. Thorndike. Rept. on Contract AT(30-1)-875. Dec 61, 8p. 2 refs.

Nuclear Engineering and Power

APAE-Memo-297 $8.10

Alco Products, Inc., Schenectady, N. Y.
SINGLE ELEMENT FLOW TESTS FOR TYPE 3 (SM-2) FUEL ELEMENTS IN SM-1, SM-1A, AND PM-2A CORES, by P. S. Krause. Rept. on Contract AT(30-1)-2639. 27 Nov 61, 83p. 5 refs.

ACNP-6123 $9.10

Allis-Chalmers Manufacturing Co., Milwaukee, Wis.
PATHFINDER ATOMIC POWER PLANT TECHNICAL PROGRESS REPT., JULY-SEP 61, on Contract AT(11-1)-589 for Northern States Power Co., Minneapolis, Minn., and Central Utilities Atomic Power Associates. 15 Feb 62, 105p.

ANL-5781(Addendum)(Rev.1) $2.25

Argonne National Lab., Ill.
HAZARDS EVALUATION REPORT ASSOCIATED WITH THE OPERATION OF EBWR AT 100 MW, by E. A. Wimunc and J. M. Harrer. Rept. on Contract W-31-109-eng-38. Oct 60, 111p. 17 refs.

ANL-6544 $1.50

Argonne National Lab., Ill.
REACTOR DEVELOPMENT PROGRAM, PROGRESS REPORT, March 1962, on Contract W-31-109-eng-38. 15 Apr 62, 63p. 18 refs.

PB 159 947 $17.50

Astronuclear Lab., Westinghouse Electric Corp., Pittsburgh, Pa.
FEASIBILITY STUDY FOR 3MW(e) NUCLEAR THERMOELECTRIC POWER PLANT, by R. A. Clark, Jr., R. A. Doncals, and others. Final rept. on Contract Nonr-3216(00). 31 Dec 60, 280p. 46 refs. Rept. no. WANL-PR(A)002; AD-253 750.

DESCRIPTORS: Nuclear power plants, *Water boiler reactors, *Electric power production, Underwater equipment, *Thermoelectricity, Sea water

The results are presented of a study of the feasibility of a 3 MW(e) nuclear power plant utilizing the concept of direct conversion thermoelectric generation. The application to deep submergence operation required characteristics of high reliability, unattended long life and basic simplicity. A satisfactory concept has been physically defined by a preliminary design study. The selected system uses a boiling water-cooled reactor incorporating a uranium dioxide fuel, water moderated plate type element with a thermal output of 45 MW. Electrical power is generated by static conversion of heat through N and P thermoelectric elements. The waste heat is dissipated to the sea water by natural convection. The thermoelectric generator acts as a condenser for the primary coolant. The plant will withstand the submergence pressure at 2000 fathoms. (Author)

AI-5272 $6.60

Atomics International, Canoga Park, Calif.
75,000 KILOWATTS OF ELECTRICITY BY NUCLEAR FISSION AT THE HALLAM NUCLEAR POWER FACILITY, by F. C. Gronemeyer and J. W. Merryman (Bechtel Corp., San Francisco). Rept. on Contract AT(11-1-GEN-8). 1960. 69p.

For presentation at ASCE Convention in Reno, Nev., on Thursday, 23 June 60.

NAA-SR-Memo-6269 $1.60

Atomics International, Canoga Park, Calif.
EXPANSION JOINT DEVELOPMENT FOR THE 50-Mwe OMCR PROTOTYPE REACTOR, by W. F. Anderson and R. A. Winborne. 28 Apr 62, 15p.

NAA-SR-5700 $22.25

Atomics International, Canoga Park, Calif.
FINAL SUMMARY SAFEGUARDS REPORT FOR THE HALLAM NUCLEAR POWER FACILITY. Rept. on Contract AT(11-1)-GEN-8. 15 Apr 61, 428p.

NAA-SR-5415 $2.25

Atomics International, Canoga Park, Calif.
KINETIC EXPERIMENTS ON WATER BOILERS "A" CORE REPORT. PART I. PROGRAM HISTORY, FACILITY DESCRIPTION, AND EXPERIMENTAL RESULTS, by John W. Flora, Edward L. Gardner and others. Rept. on Contract AT(11-1)-GEN- 8. 30 Mar 62, 110p. 10 refs.

NAA-SR-6439 $6.60

Atomics International, Canoga Park, Calif.
SNAP 2 PRIMARY COOLANT DEVELOPMENT, by M. A. Perlow. Rept. on Contract AT(11-1)-Gen-8. 15 July 61, 70p.

NAA-SR-5244 $4.60

Atomics International, Canoga Park, Calif.
SNAP 2 REACTOR PUMP DEVELOPMENT PROGRAM (RADIAL GAP PERMANENT-MAGNET PUMP), by S. Sudar. Rept. on Contract AT(11-1)-Gen-8. 1 Sep 61, 50p.

NAA-SR-4534 $1.50

Atomics International, Canoga Park, Calif.
STRESS ANALYSIS OF BELLOWS FOR THE HNPF INTERMEDIATE HEAT EXCHANGER, by R. Chipman, R. Galantine, and J. Susnir. Rept. on Contract AT(11-1)-GEN-8. 15 Apr 62, 59p. 4 refs.

BMI-1572 $1.00

Battelle Memorial Inst., Columbus, Ohio.
EVALUATION OF IRRADIATED ALUMINA-COATED UO_2 PARTICLES DISPERSED IN GRAPHITE SPHERES, by Richard J. Burian, Robert L. Ritzman and others. Rept. on Contract W-7405-eng-92. 22 Mar 62, 37p. 23 refs.

BMI-1565(Del.) $2.00

Battelle Memorial Inst., Columbus, Ohio.
PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING JANUARY, 1962, by Russell W. Dayton and Clyde R. Tipton, Jr. Rept. on Contract W-7405-eng-92. 1 Feb 62, 78p. 5 refs.

BMI-1573 $1.00

Battelle Memorial Inst., Columbus, Ohio.
RADIATION STABILITY OF COMPACTS OF ALUMINUM AND FUEL-BEARING GLASS FIBERS, by Richard J. Burian, John E. Gates, and Ronald F. Dickerson. Rept. on Contract W-7405-eng-92. 30 Mar 62, 40p. 16 refs.

BNL-713(T-250) $2.25

Brookhaven National Lab., Upton, N. Y.
THE SETTLED BED FAST REACTOR STATUS REPORT, ed. by W. A. Robba. 20 Jan 62, 115p. 18 refs.

CVNA-27 $14.00

Carolinas Virginia Nuclear Power Associates, Inc., Charlotte, N. C.
PRELIMINARY HAZARDS SUMMARY REPORT, Volume II, Part B. 15 July 59, 208p. Prepared in cooperation with Westinghouse Electric Corp., Pittsburgh, Pa.

CEND-150 (Pt. III) $1.25

Combustion Engineering, Inc., Windsor, Conn.
ADVANCED INDIRECT CYCLE WATER REACTOR STUDIES FOR MARITIME APPLICATIONS. ANALOG SIMULATION OF REACTOR PLANT TRANSIENTS. Rept. on Contract AT(30-1)-2709. 23 Oct 61, 55p.

PB 159 940 $22.25

Consumers Power Co., Jackson, Mich.
FINAL HAZARDS SUMMARY REPORT FOR BIG ROCK POINT PLANT. VOLUME I. PLANT TECHNICAL DESCRIPTION AND SAFEGUARD EVALUATION. VOLUME II, PART I. ENGINEERING DRAWINGS. VOLUME II, PART II. TOPICAL REPORTS. 14 Nov 61, 428p. 14 refs. Rept. no. NP-11153.

DESCRIPTORS: *Nuclear power plants, Safety, Design, Wind, Tables, Atmosphere, Ventilation, *Geology, *Michigan, Drainage, Soils, Lake waves

LAR-1 $1.60

Denver Research Inst., Colo.
REACTOR MATERIALS STUDY. RESEARCH AND DEVELOPMENT OF METAL HYDRIDES, by Richard L. Beck, and William M. Mueller. Quarterly rept. no. 1, 1 Oct-31 Dec 58, on Contract AT(33-3)-3. 15 Jan 59, declassified 26 Mar 62. 18p.

LAR-2 $2.60

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REACTOR MATERIALS STUDY. RESEARCH AND DEVELOPMENT OF METAL HYDRIDES, by Richard L. Beck. Quarterly rept. no. 4, 1 July-30 Sep 59, on Contract AT(33-3)-3. 30 Oct 59, declassified 26 Mar 62. 24p.

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REACTOR MATERIALS STUDY. RESEARCH AND DEVELOPMENT OF METAL HYDRIDES, by Richard L. Beck. Quarterly rept. no. 5, 1 Oct-31 Dec 59, on Contract AT(33-3)-3. 15 Jan 60, declassified 26 Mar 62. 16p.

LAR-8 $2.60

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REACTOR MATERIALS STUDY. RESEARCH AND DEVELOPMENT OF METAL HYDRIDES, by Richard L. Beck. Quarterly rept. no. 6, 1 Jan-31 Mar 60, on Contract AT(33-3)-3. Apr 60, declassified 26 Mar 62. 22p.

LAR-9 $1.60

Denver Research Inst., Colo.
REACTOR MATERIALS STUDY. RESEARCH AND DEVELOPMENT OF METAL HYDRIDES, by Richard L. Beck. Quarterly rept. no. 7, 1 Apr-30 June 60, on Contract AT(33-3)-3. July 60, declassified 26 Mar 62. 16p.

LAR-10 $8.10

Denver Research Inst., Colo.
RESEARCH AND DEVELOPMENT OF METAL HYDRIDES, by Richard L. Beck. Summary rept. 1 Oct 58-30 Sep 60, on Contract AT(33-3)-3. Nov 60, declassified 26 Mar 62. 93p.

DC-56-12-105 $3.60

General Electric Co., Cincinnati, Ohio.
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704 COMPUTER EVALUATION OF ANNULAR REACTOR ANALYTIC, TWO-ENERGY-GROUP ANALYSIS, by A. J. Ness. Rept. on Contract AT(11-1)-171. 15 Dec 56, 15p.

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General Electric Co., Cincinnati, Ohio.
CERAMIC INSULATED MAGNET WIRE FOR HIGH TEMPERATURE-RADIATION ENVIRONMENT: DEVELOPMENT AND EVALUATION, by K. W. Arnold. Rept. on Contracts AT(11-1)-171 and AF-33(038)-21102. 31 Mar 59, 123p.

DC-57-9-32 $1.60

General Electric Co., Cincinnati, Ohio
EFFECT OF SURFACE OXIDATION OF FUEL ELEMENTS ON PRESSURE LOSS, by B. A. Chandler, P. E. Reis, and J. Holowach. Rept. on Contract AT(11-1)-171. 21 Aug 57, declassified 26 July 61. 16p.

DC-55-11-17 $1.60

General Electric Co., Cincinnati, Ohio.
EVALUATION OF FULL-LENGTH HTRE-A1 CARTRIDGES TESTED IN ANP BURNER RIG, by G. T. Muehlenkamp. Rept. on Contract AT(11-1)-171. 31 Oct 55, declassified 19 Apr 61. 17p.

DC-57-3-164 $3.60

General Electric Co., Cincinnati, Ohio.
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DC-57-10-39 $1.60

General Electric Co., Cincinnati, Ohio.
FLOW DISTRIBUTION STUDIES USING LEAD ACETATE AND HYDROGEN SULPHIDE GAS, by J. Holowach and Fred J. Frank. Rept. on Contract AT(11-1)-171. 26 Sep 57, declassified 26 July 61. 19p.

DC-58-1-1 $5.60

General Electric Co., Cincinnati, Ohio
FUEL ELEMENT TASK FORCE: APPLIED MATERIALS RESEARCH, by P. K. Conn, P. W. Davis, and others. Progress rept. on Contract AT(11-1)-171. 31 Dec 57, declassified 26 July 61. 52p.

DC-55-8-109 $1.10

General Electric Co., Cincinnati, Ohio.
GENERALIZED XENON POISONING CURVES FOR USE IN REACTIVITY CALCULATIONS, by R. M. Cohen and H. R. Dries. Rept. on Contracts AT(11-1)-171, AF33(038)-21102, and AF33(600)-38062. 24 Aug 55, declassified. 8p.

DCL-57-1-129 $1.60

General Electric Co., Cincinnati, Ohio. INVENTION DISCLOSURE: A REACTOR POWER SERVO INPUT APPLICABLE TO THE CONTROL OF ANY TYPE OF NUCLEAR REACTOR, by G. E. Gorker. 29 Jan 57, declassified 8 Sep 61. 12p.

DC-59-11-160 $3.60

General Electric Co., Cincinnati, Ohio THE RADIATION TESTING OF A FUEL ELEMENT WITH SPECIAL THERMOCOUPLE ATTACHMENTS, LTTC-1, by Jack D. Elkins. Rept. on Contract AT(11-1)-171. 16 Oct 59, declassified 26 July 61. 41p.

APEX-237 $1.60

General Electric Co., Cincinnati, Ohio. RESULTS OF NUCLEAR PARAMETER STUDY OF PENTALENE MODERATED REACTORS, by R. M. Cohen. 24 Nov 54, declassified 18 July 61. 12p. XDC-54-12-17.

DC-57-11-65 $1.60

General Electric Co., Cincinnati, Ohio. STRUCTURAL EVALUATION OF A CORRUGATED FUEL ELEMENT, by R. A. Stanley and J. Holowach. Rept. on Contract AT(11-1)-171. 4 Nov 57, declassified 26 July 61. 16p.

DC-59-8-196 $3.60

General Electric Co., Cincinnati, Ohio. TEMPERATURE RESPONSE OF D-102-A2-(A) CORE COMPONENTS TO STARTUP, by W. C. Powell. Rept. on Contract AT(11-1)-171. 24 Aug 59, declassified 1 June 61. 40p.

DC-57-11-718 $2.60

General Electric Co., Cincinnati, Ohio. TEST OPERATING REPORT: GE-ANP-2SM2 SPECIAL MATERIALS TEST IN THE MTR, by T. D. Price. Rept. on Contract AT(11-1)-171. 22 Nov 57, declassified 26 July 61. 27p.

GEL-0702 $4.60

General Engineering Lab., Schenectady, N. Y. THE CHROMEL A VS. NO. 875 ALLOY THERMOCOUPLE SYSTEM FOR FUEL ELEMENT TEMPERATURE MEASUREMENTS, by A. I. Dahl. Summary rept. on Contract AT(11-1)-171. 17 Nov 59, declassified. 45p.

HW-72998 $0.50

Hanford Atomic Products Operation, Richland, Wash. INVESTIGATION OF PYROLYTIC GRAPHITE AS CRUCIBLE MATERIAL FOR ZIRCONIUM MELTING, by R. E. Westerman. Rep. on Contract AT(45-1)-1350. Mar 62, 11p. 1 ref.

HW-69632 $2.60

Hanford Atomic Products Operation, Richland, Wash. NPR PROJECT SECTION MONTHLY DESIGN TEST AND DEVELOPMENT PROGRAM STATUS REPORT CAI-816, APRIL 1961, by L. P. Reinig. Rept. on Contract AT(45-1)-1350. 30 Apr 61, 30p.

HW-71666 $2.00

Hanford Atomic Products Operation, Richland, Wash. NUCLEAR SAFETY AND CRITICALITY OF PLUTONIUM, by E. D. Clayton and W. A. Reardon. Rept. on Contract AT(45-1)-1350. Nov 61, 79p. 50 refs.

HW-61236(Sup. 4) $1.25

Hanford Atomic Products Operation, Richland, Wash. PLUTONIUM RECYCLE TEST REACTOR FINAL SAFEGUARDS ANALYSIS. SUPPLEMENT 4. GAS-COOLED LOOP ANALYSIS, by N. G. Wittenbrock. Rept. on Contract AT(45-1)-1350. Mar 62, 47p. 12 refs.

HW-70999 $0.75

Hanford Atomic Products Operation, Richland, Wash. SPECIFICATIONS FOR VIBRATIONALLY COMPACTED UO_2 NESTED TUBULAR FUEL ELEMENT (PRTR MARK II-C), by M. K. Millhollen. Rept. on Contract AT(45-1)-1350. Dec 61, 30p. 7 refs.

HW-72245 $0.50

Hanford Atomic Products Operation, Richland, Wash. THERMAL EXPANSION OF PLUTONIUM CARBIDES, by P. G. Pallmer. Rept. on Contract AT(45-1)-1350. Feb 62, 8p. 6 refs.

KAPL-2000-17 $2.25

Knolls Atomic Power Lab., Schenectady, N. Y. REACTOR TECHNOLOGY REPORT NO. 20: METALLURGY. Rept. on Contract W-31-109-eng-52. Mar 62, 94p. 24 refs.

LA-2689 $2.75

Los Alamos Scientific Lab., N. Mex. ULTRA HIGH TEMPERATURE REACTOR EXPERIMENT (UHTREX) HAZARD REPORT, on Contract W-7405-eng-36. 20 Apr 62, 164p. 30 refs.

MND-MD-2560-3 $11.00

Martin Marietta [Corp.] Baltimore, Md.
PM RESEARCH AND DEVELOPMENT PROGRAM, by R. L. Baer. Quarterly progress rept. no. 3, 1 Oct-30 Dec 61, on Contract AT(30-1)-2706. Feb 62, 141p.

ORO-481 $8.10

National Carbon Co., Fostoria, Ohio.
GRAPHITE-MATRIX NUCLEAR FUEL ELEMENTS. Interim status rept. phase III, on Contract AT(40-1)-2560. 30 June 61, 89p. 21 refs.

NMI-7245 $1.60

Nuclear Metals, Inc., Concord, Mass.
POWER REACTOR PROGRAM, by S. Isserow, R. W. Anderson, and W. L. Larson. Progress rept. 1-30 Nov 61, on Contract AT(30-1)-1565. 12 Jan 62, 12p.

ORNL-TM-149 $7.60

Oak Ridge National Lab., Tenn.
CRITERIA FOR THE DESIGN OF THE THORIUM FUEL CYCLE DEVELOPMENT FACILITY, by A. R. Irvin and A. L. Lotts. 2 Mar 62, 80p.

ORNL-TM-128 $2.60

Oak Ridge National Lab., Tenn.
DEVELOPMENT OF FREEZE VALVE FOR USE IN THE MSRE, by M. Richardson. Rept. on Contract W-7405-eng-26. 28 Feb 62, 21p. 2 refs.

ORNL-TM-158 $1.10

Oak Ridge National Lab., Tenn.
DIRECTIONS FOR THE FABRICATION OF A PROBE FOR THE MEASUREMENT OF PLATE SPACING IN PLATE-TYPE FUEL ELEMENTS, by S. E. Dismuke. Rept. on Contract W-7405-eng-26. 11 Apr 62, 7p. 3 refs.

ORNL-TM-191 $6.60

Oak Ridge National Lab., Tenn.
EFFECT OF REDUCED U-235 PRICE ON FUEL CYCLE COSTS, by L. L. Bennett. 7 Mar 62, 74p. 4 refs.

ORNL-TM-134 $19.75

Oak Ridge National Lab., Tenn.
EGCR EXPERIMENTAL LOOPS, by F. H. Neill and C. Michelson. Preliminary design rept. on Contract W-7405-eng-26. 27 Mar 62, 311p. 5 refs.

ORNL-TM-171 $3.60

Oak Ridge National Lab., Tenn.
GCR-ORR LOOP NO. 2 FILTER TESTS. II, by F. A. Flint and A. M. Smith. 19 Feb 62, 32p. 2 refs.

ORNL-TM-10 $9.10

Oak Ridge National Lab., Tenn.
ORR OPERATIONS FOR PERIOD APRIL 1960-APRIL 1961, by J. A. Cox. 20 Oct 61, 106p. 7 refs.

ORNL-TM-172 $3.60

Oak Ridge National Lab., Tenn.
PRELIMINARY DESIGN OF THE HFIR CORE AND PRESSURE VESSEL ASSEMBLY, by J. R. McWherter. 21 Mar 62, 36p. 15 refs.

ORNL-TM-178 $3.60

Oak Ridge National Lab., Tenn.
A STUDY OF THE SHIELD OF THE UNIVERSITY OF ILLINOIS TRIGA MARK II RESEARCH REACTOR, by T. V. Blosser, R. M. Freestone, Jr., and J. M. Miller. Rept. on Contract W-7405-eng-26. 23 Apr 62, 31p. 6 refs.

ORNL-TM-182 $1.60

Oak Ridge National Lab., Tenn.
THE SUBCRITICAL REACTOR WITH SOURCES, by C. A. Preskitt. 13 Mar 62, 16p. 3 refs.

ORNL-TM-106 $8.60

Oak Ridge National Lab., Tenn.
SUMMARY OF HRT RUNS 22, 23 AND 24, by H. F. Bauman, J. R. Buchanan and others. Rept. on Contract W-7405-eng-26. 6 Mar 62, 93p. 48 refs.

ORNL-TM-79 $5.60

Oak Ridge National Lab., Tenn.
WATER TEST DEVELOPMENT OF THE FUEL PUMP FOR THE MSRE, by P. G. Smith. Rept. on Contract W-7405-eng-26. 27 Mar 62, 52p. 6 refs.

IDO-16727 $2.25

Phillips Petroleum Co., Idaho Falls.
FUEL ELEMENT DEVELOPMENT, by G. W. Gibson and O. K. Shupe. Annual progress rept. for FY 1961, on Contract AT(10-1)-205. 9 Mar 62, 109p. 20 refs.

IDO-16678 $1.25

Phillips Petroleum Co., Idaho Falls.
MTR FAST NEUTRON FLUX MEASUREMENTS FOR CYCLE 146, by L. D. Weber and C. H. Hogg. Rept. on Contract AT(10-1)-205. 20 Mar 62, 49p.

IDO-16751 $1.25

Phillips Petroleum Co., Idaho Falls.
SELF-LIMITING POWER EXCURSION TESTS OF A WATER-MODERATED LOW-ENRICHMENT UO_2 CORE IN SPERT I, by A. H. Spano, J. E. Barry and others. Rept. on Contract AT(10-1)-205. 28 Feb 62, 49p. 12 refs.

IDO-16661 $1.60

Phillips Petroleum Co., Idaho Falls.
STANDARD MTR FUEL LOADING PROCEDURE, by R. W. Goin. Rept. on Contract AT(10-1)-205. 30 Jan 61, 18p.

PNE-108P $1.75

Sandia Corp., Albuquerque, N. Mex.
PARTICLE MOTION NEAR A NUCLEAR DETONATION IN HALITE, by W. D. Weart. Plowshare Program, Project Gnome. Feb 62, 65p. 41 refs.

DP-679 $0.50

Savannah River Lab., Aiken, S. C.
KNURLING FUEL TUBE SURFACES, by D. Baker, Jr. Rept. on Contract AT(07-2)-1. Feb 62, 14p. 3 refs.

DP-678 $1.00

Savannah River Lab., Aiken, S. C.
MINIATURE PURIFICATION PROGRESS REPORT. I. DESCRIPTION OF EQUIPMENT, TESTS Ia, Ib, AND II, by E. W. Baumann. Rept. on Contract AT(07-2)-1. Feb 62, 46p.

TID-15154 $8.10

Stanford U., Calif.
LINEAR ELECTRON ACELERATOR STUDIES. Final rept. on Contract AT(04-3)-21. Dec 61, 88p. ML-882; M-291.

UNC-3001 $3.60

United Nuclear Corp., New Haven, Conn.
NUCLEAR FUEL RESEARCH, FUEL CYCLE DEVELOPMENT PROGRAM. Quarterly progress rept. 1 Oct-31 Dec 61, on Contract AT(30-1)-2374. 1 Feb 62, 34p.

Nuclear Reactions

ARF-1164-15 $2.00

Armour Research Foundation, Chicago, Ill.
RESEARCH ON NEUTRON INTERACTIONS IN MATTER AS RELATED TO IMAGE FORMATION, by H. V. Watts. Rept. on Contract AT(11-1)-578. 12 Oct 61, 87p. 27 refs.

DC-57-8-83 $1.10

General Electric Co., Cincinnati, Ohio.
RATIOS OF COMPTON SCATTERING AND TOTAL ATTENUATION COEFFICIENTS, by M. A. Capo. Rept. on Contract AT(11-1)-171. 9 Aug 57, 7p.

ORO-539 $2.60

Georgia Inst. of Tech. Engineering Experiment Station, Atlanta.
IONIZATION AND CHARGE TRANSFER CROSS SECTIONS. PHASE III: FAST He^+ IONS INCIDENT ON He, Ne, Ar, H_2, N_2, AND CO, by E. W. McDaniel, D. W. Martin and others. Technical status rept. no. 10 (Annual summary rept.) 1 Mar 61-28 Feb 62, on Contract AT(40-1)-2591. 1 Mar 62, 26p. 7 refs.

NYO-10037 $2.60

Rochester U., N. Y.
INVARIANT ANGULAR FUNCTIONS FOR A PRODUCTION REACTION INVOLVING SPINLESS PARTICLES, by A. J. Macfarlane. Rept. on Contract AT(30-1)-875. 6 Feb 62, 24p.

Radioactivity

TID-15117 $1.60

Duquesne Light Co., Shippingport, Pa.
ENVIRONMENTAL RADIATION MONITORING. Quarterly rept. Oct-Dec 61, on Contract AT(11-1)-292. [1962] 14p.

DC-55-5-87 $1.10

General Electric Co., Cincinnati, Ohio.
GAMMA ACTIVITY IN AIR, by T. J. Kostigen. Preliminary rept. on Contracts AT(11-1)-171, AF33(038)-21102, and AF33(600)-38062. 17 May 55, declassified 10 Jan 58. 7p.

DC-58-2-129 $16.50

General Electric Co., Cincinnati, Ohio.
THERMAL NEUTRON INDUCED BETA AND GAMMA RADIOACTIVITY FOR CERTAIN ISOTOPES, ELEMENTS AND MATERIALS, by T. J. Kostigen. Preliminary rept. on Contracts AT(11-1)-171, AF33(038)-21102, and AF33(600)-38062. 22 Feb 57, 259p. 10 refs

DC-59-4-199 $2.60

General Electric Co., Cincinnati, Ohio.
URANIUM-235 FISSION PRODUCT ACTIVITY AND ENERGY AS A FUNCTION OF DECAY TIME FOR A SPECIFIC IRRADIATION TIME AND THERMAL FLUX, by C. B. Magee. Rept. on Contract AT(11-1)-171. 21 Apr 59, 28p.

SC-4678(RR) $0.50

Sandia Corp., Albuquerque, N. Mex.
FALLOUT REPORT: BETA-GAMMA RADIOACTIVITY IN AIR AT SANDIA LABORATORY, FOURTH QUARTER 1961, by R. E. Womelsduff. Mar 62, 16p. 11 refs.

Waste Disposal

HW-71573 $0.75

Hanford Atomic Products Operation, Richland, Wash.
RADIOISOTOPE AND MOISTURE DISTRIBUTION BENEATH A MODEL CRIB, by K. C. Knoll and J. L. Nelson. Rept. on AT(45-1)-1350. Jan 62, 31p. 8 refs.

ORNL-TM-127 $4.60

Oak Ridge National Lab., Tenn.
LABORATORY PROGRESS ON THE DISPOSAL OF HIGH-LEVEL RADIOACTIVE WASTE BY DEEP-WELL INJECTION, by W. J. Lacy, O. M. Sealand and others. Rept. on Contract W-7405-eng-26. 7 Mar 62, 44p. 10 refs.

ORNL-TM-133 $7.60

Oak Ridge National Lab., Tenn.
WASTE TREATMENT AND DISPOSAL PROGRESS REPORT FOR OCTOBER AND NOVEMBER 1961, by R. E. Blanco and E. G. Struxness. Rept. on Contract (W-7405-Eng-26). 13 Mar 62, 72p.

IDO-14580 $2.25

Phillips Petroleum Co., Idaho Falls,
PHASE TRANSFORMATIONS IN ALUMINA, by H. J. Eding, M. L. Huggins, and A. G. Brown. Rept. on Contract AT(10-1)-205. 14 Feb 62, 88p. 50 refs.

IDO-14568 $1.00

Phillips Petroleum Co., Idaho Falls.
TEST OF A VAPOR-SPACE FEED NOZZLE FOR CALCINING ALUMINUM NITRATE SOLUTIONS IN A FLUIDIZED BED, ed. by G. E. Lohse. Rept. on Contract AT(10-1)-205. 15 Mar 62, 43p. 4 refs.

PB 159 935 $9.60

Air Force Cambridge Research Labs., Bedford, Mass.
INFRARED ATMOSPHERIC TRANSMISSION: SOME SOURCE PAPERS ON THE SOLAR SPECTRUM FROM 3 TO 15 MICRONS, by John N. Howard and John S. Garing. Dec 61, 118p. 224 refs. Air Force Surveys in Geophysics no. 142; AFCRL-1098.

DESCRIPTORS: *Infrared radiation, Measurement, *Infrared research, Infrared spectroscopy, Solar spectrum, Thermal radiation, Upper atmosphere, Wave transmission.

Included in the report are:
The transmission of the atmosphere in the infrared, pub. in Proc. IRE 47:1451-1457, 1959
Atmospheric transmission in the 3 to 5 micron region, pub. in Proc. IRIS 2:59-75, 1957
Atmospheric transmission in the 8 to 13 micron region, pub. in Proceedings of the Symposium on Optical Radiation from Military Airborne Targets, Rept. no. AFCRL-TR-58-146
A grating map of the solar spectrum from 3.0 to 5.2 microns, pub. in The Astrophysical Jnl. 113:45-75, 1951
The solar spectrum from 7 μ to 13 μ, pub. in the Astrophysical Jnl. 116, no. 3, 1952
Fine structure of HDO near 3.7μ in the solar spectrum, pub. in The Physical Review 78:71-72, 1 Apr 50
Fine structure of N_2O near 4.06μ in the solar spectrum, pub. in The Physical Review 78:497, 15 May 50
The ozone band near 4.7μ in the solar spectrum, pub. in The Astrophysical Jnl. 117, no. 3, May 53
Water vapor absorption lines in the solar spectrum between 8μ and 13μ, pub. in The Physical Review 82:559, 15 May 51
The ozone band at 1110 cm, pub. in The Jnl. of Chemical Physics 21:558-559, Mar 53
Improved map of the solar spectrum between 9 and 10μ, pub. in The Physical Review 79:1017-1018, 15 Sep 50
The absence of atmospheric ethylene, pub. in The Physical Review 81-462-463, 1 Feb 51
Infrared solar spectroscopy at the Jungfraujoch (Switzerland), pub. in the Jnl. of the Optical Society of America 50:1305-1307, Dec 60.

PB 161 629 $2.75

American Meteorological Society, Washington, D. C.
BIBLIOGRAPHY ON AURORAL RADIO WAVE PROPAGATION, by Wilhelm Nupen. 12 Jan 62, 146p. 297 refs. NBS Technical note no. 128.

DESCRIPTORS: *Aurorae, *Radio waves, Propagation, *Bibliography

The present compilation is made up of about 300 abstracts or titles from the literature published during the period 1893-1961. It is thus only a portion of the international literature on radio-auroral research.

UCRL-6721 $0.50

Lawrence Radiation Lab., U. of California, Livermore.
SOLUTIONS OF A FAMILY OF NONLINEAR DIFFUSION EQUATIONS FOR SEMI-INFINITE MEDIA, by Ray E. Kidder. Rept. on Contract W-7405-eng-48. 11 Jan 62, 10p. 1 ref.

LAMS-2628 $0.50

Los Alamos Scientific Lab., N. Mex.
ATOMIC HYDROGEN RECOMBINATION AND CATALYSIS BY MOLECULES AND PARTICLES, by Keith A. Brueckner. Rept. on Contract W-7405-eng-36. 1 Mar 62, 12p.

PB 159 931 $3.60

Naval Radiological Defense Lab., San Francisco, Calif.
THERMAL CONDUCTIVITY MEASUREMENTS ON BISMUTH TELLURIDE IN THE PRESENCE OF A 2 MEV ELECTRON BEAM, by W. J. Parker and R. J. Jenkins. 2 Sep 60, 36p. 3 refs. Research and development technical rept. USNRDL-TR-462; AD-245 577.

DESCRIPTORS: *Semiconductors, Heat transfer, Bismuth compounds, Tellurides, Electron beams, *Radiation damage, Ionization, *Thermoelectricity.

A procedure is described for making thermal diffusivity measurements of semiconducting materials in the presence of a 2 Mev electron beam. The thermal diffusivity of four samples of bismuth telluride, including both n and p types, is plotted against temperature, and its independence of the electron bombardment with incident currents up to 15 microamperes per square centimeter is demonstrated. The thermal conductivity versus temperature is also given for these four specimens. If it is assumed that the specific heat is unaffected by the electron beam, the thermal conductivity, which is equal to the product of the thermal diffusivity and the volumetric heat capacity, is also unaffected.

TID-15059 $1.10

Oak Ridge Gaseous Diffusion Plant, Tenn.
EFFECT OF CORRELATION BETWEEN ENERGIES OF INCIDENT AND SCATTERED PARTICLES ON THE PERMEABILITY OF POROUS MEDIA. Rept. on Contract W-7405-eng-26. 8 Oct 56, 6p.

PB 159 930 $11.00

Pennsylvania State U., University Park.
EXPERIMENTAL INVESTIGATION OF STRESS WAVES IN ELASTIC SOLIDS, by J. N. Brennan, J. A. Sauer, and Donald Edgar Kline. Technical rept. no. 2 (Final), 16 Sep 55-31 Jan 57, on Contract DA 36-061-ORD-448, continuation of Contract DA 36-061-ORD-379. 15 Feb 57, 147p. 84 refs. Rept. no. WAL 893/192-1; AD-134 891.

DESCRIPTORS: *Solids, Stresses, Ultrasonic properties, *Rods, Vibration, Internal friction.

Included in the report are:
Dispersion of ultrasonic pulse velocity in cylindrical rods, pub. in The Journal of the Acoustical Society of America 27:550-555, May 55
Internal friction in aluminum alloy rods at sonic frequencies and large amplitudes
Large amplitude vibrations of rods and tubes at audiofrequencies, pub. in The Jnl. of the Acoustical Society of America 25:610-616, July 53
Internal friction phenomena in solids.

Theoretical Physics

PB 158 924 $7.60

California U., Berkeley.
FOUNDATIONS OF GENERAL RELATIVITY, by Ralph Abraham. Rept. on National Science Foundation Grant 19136. Oct 61, 77p. 14 refs.

DESCRIPTORS: *Relativity theory, Physics, Mathematics, Geometry, Algebraic topology, Topology, Tensor analysis, Algebra, Geodesics, Wave analysis, Fluid flow, Galaxies, Solar systems, Differential geometry.

This report is an exposition of the geometric aspects of general relativity for mathematicians and physicists. Except for the omission of easy proofs, and some difficult theorems referred to in the remarks, it is complete and self-contained.

NYO-10032 $2.60

Rochester U., N. Y.
THE REDUCTION OF OPERATOR RINGS AND THE IRREDUCIBILITY AXIOM IN QUANTUM FIELD THEORY, by Thomas F. Jordan and E. C. G. Sudarshan. Rept. on Contract AT(30-1)-875. 9 Jan 62, 23p. 17 refs.

Thermodynamics

PB 159 949 $5.60

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
INTERFEROMETER STUDY OF HEAT TRANSFER FROM HORIZONTAL CYLINDERS IN FREE CONVECTION, by Luke H. Boykin, Jr. Master's thesis. Aug 60, 56p. 5 refs. Rept. no. GAE/ME/60-2; AD-243 827.

DESCRIPTORS: *Heat transfer, *Interferometers, Convection, Cylindrical bodies, *Fuel rods, Boundary layer, Nuclear power plants, Fuel elements.

The average and local non-dimensional heat transfer coefficients are determined for systems of horizontal cylinders in free convection. A single cylinder is investigated and compared with different spacings of two level cylinders, three cylinders in an equilateral

triangular arrangement, and four cylinders in a diamond form. The positions of the cylinders in each arrangement are varied in small increments from positions of isolation to positions of interaction. Curves are presented which indicate the relative heat transfer coefficients for all of the arrangements and spacings studied. Mutual interaction is seen to increase the heat transfer film coefficient of some positions while it decreases in others. Interferometer photographs of several interesting arrangements are presented with graphs of the corresponding local heat transfer coefficients. (Author)

NAA-SR-MEMO-6581 $4.60

Atomics International, Canoga Park, Calif.
RE-EVALUATION OF ENERGY ABSORPTION RATE IN OMR's, by D. S. Duncan. Rept. on Contract AT(11-1)-Gen-8. 13 July 61, 43p.

NAA-AER-MEMO-1173 $1.60

[Atomics International, Canoga Park] Calif.
THE VAPOR PRESSURES AND DENSITIES OF LIQUID FLUORINE-OXYGEN MIXTURES, by Daniel D. Cubicciotti and H. Hori. Rept. on Contract AT(11-1)-Gen-8. 19 Nov 54, 12p.

DC-60-5-57 $4.60

General Electric Co., Cincinnati, Ohio.
GENERALIZED PRESSURE LOSS COMPUTATIONS FOR HEAT ADDITION TO AIR FLOWING IN CONSTANT AREA DUCTS, by M. Lapides, R. Motsinger and others. Rept. on Contract AT(11-1)-171. 11 May 60, 30p.

DC-59-8-37 $1.60

General Electric Co., Cincinnati, Ohio.
MONTE CARLO RESEARCH SERIES: PRE-SAMPLED ENERGY DEPOSITION METHOD FOR GAMMA HEATING CALCULATIONS, by J. R. Beeler, M. D. McDonald, and J. F. Quinlan. Rept. on Contract AT(11-1)-171. Mar 59, 14p.

PB 161 638 $2.25

National Bureau of Standards, Boulder, Colo.
A BIBLIOGRAPHY OF THE THERMOPHYSICAL PROPERTIES OF OXYGEN AT LOW TEMPERATURES, by J. C. Hust, L. D. Wallace, and others. Feb 62, 88p. 325 refs. Technical note no. 137.

DESCRIPTORS: *Oxygen, Cryogenics, Temperature, Mechanical properties, Thermodynamics, Transport properties, Pressure, *Bibliography, Low temperature research.

This bibliography of the mechanical, thermodynamic and transport properties of oxygen below 0°C presents 325 references and is the result of a thorough search of the world's scientific and engineering literature. In addition to searching abstracting journals and bibliographies, the authors reviewed each document for property data and for additional references. Listed for each reference are the properties and the corresponding temperature and pressure range, together with additional pertinent information such as the type of data (i.e., whether the data are derived from experimental measurements, theoretical considerations or as a compilation from other sources), the form and amount of data, etc. An index according to property, sub-indexed for temperature and pressure ranges, and an author index are included. (Author)

RESEARCH METHODS, TECHNIQUES AND EQUIPMENT

PB 181 091 $5.00

Office of Naval Research, Washington, D. C.
NAVY RESEARCH TASK SUMMARY, 1961, [1962] 362p. 3,580 refs.

DESCRIPTORS: *Naval research, *Scientific research, Research program administration, Naval equipment, Targets, Aerial photography, Navigation, Meteorological charts, Mapping, Officer personnel, Games theory, Communication systems, Communication equipment, Data processing systems, Weapons, Ordnance, Guided missiles, National defense, Aircraft, Ships, Submarines, Boats, Amphibious vehicles, Logistics, Naval personnel, Training, Warfare, Astronautics, Chemistry, Physics, Mathematics, Earth, Biology, Psychology, Materials, Electronics, Engineering, Mechanics, Nuclear physics, Thermodynamics.

This volume contains summary descriptions of the unclassified portions of the Navy's basic and applied research program. The descriptions are necessarily brief because of the large amount of scientific research involved and because of the unclassified nature of the report. The volume contains summaries of work being performed by the Bureau of Naval Weapons, the Bureau of Ships, the Bureau of Medicine and Surgery, the Bureau of Yards and Docks, the Bureau of Naval Personnel, and the Office of Naval Research.

SOCIAL SCIENCES

PB 159 928 $1.60

Army Ballistic Missile Agency, Huntsville, Ala.
COMPUTER APPLICATION OF ENGINEERING DOCUMENTATION, by David L. Foutch and Michael J. Henry. 5 Jan 60, 15p. Rept. no. DC-TR-33-59; AD-234 201.

DESCRIPTORS: *Documentation, Punched card methods, Digital computers, *Programming, *Mechanical engineering.

A mechanized engineering documentation system is described. The establishment of a data file, the purge of the data file, and the preparation of the parts generation list are also described. The use of a parts generation breakdown as well as future applications is presented. (Author)

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U. S. DEPARTMENT OF COMMERCE FIELD OFFICES

SERVE THE BUSINESS COMMUNITY

The Department of Commerce maintains Field Offices to enable the business community to avail itself locally of Government facilities designed to promote commerce. Working closely with various units in the Department and, when necessary, with other Government agencies, the Field Offices provide business services to manufacturers, wholesalers, retailers, trade publications, trade associations, advertising agencies, research groups, financial institutions, and exporters and importers.

Experienced personnel will gladly assist in the solution of specific problems, explain the scope and meaning of regulations administered by the Department, and provide practical assistance in the broad field of domestic and foreign commerce. Field offices act as official sales agents of the Superintendent of Documents, and maintain an extensive business reference library containing periodicals, directories, publications and reports from official as well as private sources.

Among the many services which businessmen have found of value are:

GENERAL

- Management and business aids
- Establishing a new business

BASIC ECONOMIC DATA

- Census data, with national and often State and regional breakdowns, on manufacturing, wholesaling, retailing, service industries, employment and unemployment, population, housing, agriculture
- Basic records of national income and product, regional trends, balance of payments, foreign aid

MARKETING AND DISTRIBUTION

- Development and maintenance of markets
- Distribution channels, facilities and services
- Marketing and distribution statistics

PRODUCTION

- Modernization of plant processes and other technological aids
- Development of new products
- Government-owned patents for free license
- Commodity standards

FOREIGN TRADE AND INVESTMENT

- Tariff and exchange regulations
- Import and export quotas, licensing regulations
- Statistics on imports and exports
- Investment and trade opportunities abroad
- Economic conditions in foreign countries

COOPERATIVE OFFICES

To make the services of the Department of Commerce more widely available, agreements have been entered into with more than 750 Chambers of Commerce, Manufacturers Associations, and similar business groups under which these organizations have become official Cooperative Offices of the Department. If specific information is not on hand in the Cooperative Office, your problem will be referred to the nearest Departmental field office.

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